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THE 58th ANNUAL MEETING
FLORIDA ACADEMY OF SCIENCES

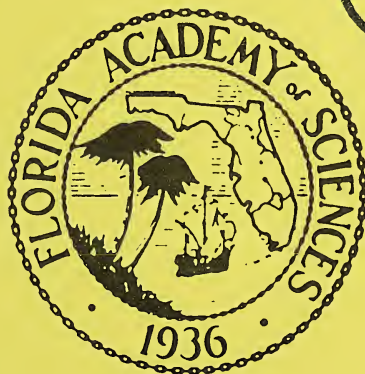
MARCH 24-26, 1994

FLORIDA A&M UNIVERSITY
Tallahassee, Florida

Florida Scientist



**IN TOUCH
WITH PEOPLE...**



**... IN TOUCH
WITH
THE
FUTURE**

Program Issue

Volume 57

Supplement 1

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Program Chair: Dr. R. Del Delumyea, Director, Millar Wilson Laboratory for Chemical Research, Jacksonville University, 2800 University Blvd. N., Jacksonville, FL 32211. (904) 744-3950 ext. 7332.

SECTION OFFICERS

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Social Sciences	Michael Raich, Sarasota County Govt.
Urban & Regional Planning	Lisa Beever, Charlotte County Metropolitan Planning Organization.

THE 58th ANNUAL MEETING

FLORIDA ACADEMY OF SCIENCES

PLENARY SESSIONS:

Friday, March 25, 1994, 10:30-12:00 AM

The Future of Science Teaching in Florida. Moderator: Dr. R. Del
Delumyea, Director, Millar Wilson Laboratory for Chemical Research,
Jacksonville University.

Saturday March 26, 1994, 10:30-12:00 AM

Evaluation of Environmental Problems of Minority Communities.
Moderator: Dr. David Woodbridge, Health Physicist, College of Public
Health, University of South Florida, Tampa.

SPECIAL SYMPOSIA

Friday, March 25, 1994, 2:00-5:30 PM.

Agriculture-The Environmental Issue "Villain or Victim". Moderator:
S. K. Pancholy, Florida A&M University

Saturday March 26, 1994, 8:30-10:00 AM

**Factors Influencing Instruction and Retention in Introductory Science
Courses.** Florida-Georgia Alliance for Minority Participation in Science,
Engineering and Mathematics.

BANQUET ADDRESS by Professor D. O. Shah, 1993 Academy Medalist

THE WORLD OF SURFACE SCIENCE.

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1994 Florida Academy of Sciences Annual Meeting

WELCOME

Welcome to the 58th Annual Meeting of the Florida Academy of Sciences. The Academy, a multi-disciplinary association whose goal is to facilitate the exchange of scientific ideas in the State, is proud of the program of this year's meeting. The Academy welcomes those who have been with us before and those attending her or his first Academy Meeting. The Academy has attempted to reach out to the public through symposia and special sessions on topics of current interest. This year's Plenary Symposia and the Florida Medalist's banquet address promise to stimulate a great deal of discussion both within the scientific community and the public at large. As always, presenters at the meeting are urged to consider submitting manuscripts for publication in the official outlet for the Academy, the Florida Scientist. I hope you enjoy the meeting.

Pat Gleason, 1994 President, Florida Academy of Sciences

MEETING INFORMATION**GENERAL INFORMATION ON ACADEMY**

General information about the Florida Academy of Sciences and this year's meeting program may be obtained from the Executive Secretary, Mrs. Betty Preece, P. O. Box 033012, Indialantic, FL 32903. Tel (407) 723-6835.

MEETING LOCATION

The meeting will be held at Florida Agricultural and Mechanical University in Tallahassee, Florida. Local and campus maps are shown on the back of this Meeting Program. The University will be on break and parking is no problem. The Chair of the Local Arrangements Committee is Mr. Leonard Inge, School of Graduate Studies, Research and Continuing Education, Division of Continuing Education, Florida Agricultural and Mechanical University, Tallahassee, FL 32307. Tel. (904) 599-3474. Special arrangements (including handicapped services information) should be discussed with him prior to the meeting.

LOCAL AREAS OF INTEREST AND FIELD TRIPS

Field trips and visits to scientific locations in the Tallahassee area will be organized. Details of these will be at the registration desk and some are provided in the Program Issue, sent to all participants who pre-register. The meeting will last two days so plan to take advantage of the opportunities.

San Luis Archaeological and Historic Site. Located less than three miles from the Capitol, San Luis is one of Tallahassee's most charming historical sites and the only one that boasts a full-time research staff of archaeologists and a historian. A good tour (free) of the over-50 acre park takes about 1.5 hours, and most people like some time in the Visitor Center and History Shop.

National High Magnetic Field Lab, FSU, Tallahassee, Saturday, March 26, 8:30-10:30 am. Dr. Jack Crow, Director of the Laboratory, will provide an overview of the lab and its operation, then conduct a tour. Wear comfortable, closed shoes for walking; slacks recommended for women. Sign up at FAS Registration Desk at FAMU. Trip is limited to the first 25 to sign up. For information, call or FAX (407) 723-6835. Sponsored by AAPT and FAS.

REGISTRATION

All participants are expected to register. A registration desk will be open in the Tucker Hall lobby from 7:30 am to 4:00 pm on Friday, March 25, and from 8:00 am to 9:30 am on Saturday, March 26. The on-site registration fee is \$40 for regular members, \$65 for non-members, and \$30 for students. Members receive the program issue by mail, as will others registered by February 14, 1994. Extra programs cost \$4.00.

LODGING

No reservations can be made through the Academy. The following motels are within a 5 minute drive of campus. All are providing discounts to Academy members. Please make reservations well in advance to ensure motel space during the legislative session and mention your affiliation with FAMU.

Sheraton Hotel, 101 S. Adams, Tal. (904) 224-5000. Sgl/Dbl \$79.

Holiday Inn/Downtown University Center, 316 W. Tennessee St., Tal. (904) 222-8000. Sgl \$69, Dbl \$79.

Best Western Pride Inn and Suites, 2016 Apalachee Parkway, Tal. (904) 656-6312. Sgl \$37, Dbl \$42.

Days Inn Downtown, Capitol Center, 722 Apalachee Parkway, Tal. (904) 224-2181. Sgl/Dbl (max. four) \$34.50.

Days Inn, 1350 W. Tennessee, Tal. (904) 222-3219. Sgl \$29.

ACADEMY BANQUET and other MEALS

Food services will be available on Friday and Saturday for breakfast and lunch in the snack bar of the cafeteria.

Academy Banquet tickets must be purchased with advanced registration to permit the correct number of meals to be prepared. The buffet consists of a choice of entree (please indicate your choice of vegetarian, turkey, or fish on the registration form) plus a tossed salad, mixed vegetables, rolls, coffee, tea and assorted desserts. The cost is \$18 per person, which includes the Reception to be held prior to the Academy Banquet.

EXECUTIVE COMMITTEE MEETING

The annual meeting of the Executive Committee of the Florida Academy of Sciences will be held in Tucker Hall, Room 113 at 1:00 pm on Thursday, March 24.

ANNUAL BUSINESS MEETING

The Academy's annual business meeting will begin at 12:15 pm on Friday afternoon, March 25, 1994. Members of the Executive Committee and Section Chairs are asked to bring written 1993-1994 reports.

FLORIDA JUNIOR ACADEMY OF SCIENCES MEETING

The annual meeting of the Junior Academy will be held March 24-25, 1994, at Florida A&M University. Volunteers are needed to assist in the judging of student papers on

March 24. Persons interested in participating should contact the FJAS Coordinator: Mrs. Cathy Gotshall, Melbourne Central Catholic High, 100 E. Florida Ave., Melbourne, FL 32901. Telephone Number: (407) 727-0793. The Awards Ceremony for the Junior Academy will be held at the start of the Plenary Symposium on Friday, March 25, 1994, at 10:15 AM.

INFORMATION FOR SPEAKERS

All rooms have slide projectors and screens. Speakers wishing to use transparencies (overhead slides) should verify with their session chair that a projector will be provided for that session. Speakers requiring special equipment must contact the chair of the local arrangements committee. Student speakers should identify themselves to the session chair prior to speaking.

If an author or co-author is scheduled to speak but cannot attend due to unforeseen circumstances, arrangements should be made for a colleague to present the paper. If a reader cannot be found, the paper should be canceled. The Academy must be notified of a substitute speaker or cancellation, by contacting the appropriate section chair.

A Speaker's Room will be set up in Tucker Hall, Room 115, where presenters can review their slides and notes, relax, write and so forth. An overhead projector and slide equipment will be available there. Speakers may wish to check that their slides are correctly mounted. This room will be unlocked and unsupervised.

LOCAL ARRANGEMENTS

Special needs during the meeting at Florida A&M University are coordinated by the Chair of the Local Arrangements Committee, Mr. Leonard Inge. His address and phone number are: School of Graduate Studies, Research and Continuing Education, Division of Continuing Education, Florida Agricultural and Mechanical University, Tallahassee, FL 32307. Tel. (904) 599-3474. Special arrangements (including handicapped services information) should be discussed with him prior to the meeting. He should be consulted on all aspects of meeting support, including special services.

PUBLICATION

The 1994 Annual Program Issue, is Supplement Number 1 to Volume 57 of the Florida Scientist and will be distributed to more than 200 domestic and foreign libraries as well as major abstracting services.

SPECIAL ANNOUNCEMENT: Amendments to bylaws of the Florida Academy of Sciences, Inc.

Pursuant to Council action on January 16, 1993, two amendments to the bylaws of the Florida Academy of Sciences, Inc. will be considered for adoption at the annual business meeting. One amendment changes the grade-level of students eligible for membership in the Junior Academy. The other amendment changes criteria for Emeritus membership. Section 2, Article XI of the Academy's charter provides for the adoption, alteration, amendment or rescision of Bylaws at any annual business meeting of the Corporation if approved by a two-thirds (2/3) vote of members present, provided notice of proposed

Note: Words in brackets [] are to be deleted and underlined words are additions:

Amendment One: Amends Bylaws, Article I Section 2, Definition of Classes, as follows:

Item h. Members who are secondary school students of grades [seven] six to twelve inclusive shall be designated as Junior Members.

Amendment Two: Amends Bylaws, Article I Section 2, Definition of Classes, as follows:

Item i. Regular members who have been in good standing for ten (10) years and who are active in the Academy at time of retirement shall be designated Emeritus Members.

EXHIBITS. Commercial, non-profit and educational institutions, organizations or companies are being encouraged to set up exhibits of topics and programs of interest to the Academy.

ACADEMY BANQUET ADDRESS. Professor D. O. Shah, Director, Center for Surface Science and Engineering, Departments of Chemical Engineering and Anesthesiology, University of Florida, is the 1993 Academy Medalist winner. His talk at the annual Academy Banquet, 8:30 p.m. on Friday, March 25, 1994, is described below:

"The World of Surface Science." All objects in the world are made of solids, liquids and gases. There are five basic interfaces i.e. g/l, l/l, s/l, s/g, and s/s surrounding all objects. Surface tension or surface free energy is associated with every interface. Surfactant molecules consist of non-polar and polar groups. They accumulate at interfaces and decrease the surface free energy. Surfactant molecules aggregate in various association structures such as micelles, liquid crystals, and microemulsions. Various technological processes such as detergency, foaming, emulsification, wetting and preparation of nanoparticles involve surfactant association structures. Similar to three dimensional matter, two dimensional monomolecular films of surfactant can exhibit various phase transitions by temperature. The lecture will emphasize the importance of surface phenomena in biomedical and engineering systems.

PLENARY SYMPOSIA:

The Future of Science Teaching in Florida. Friday, March 25, 1994, 10:30 AM-12:00 PM.
Moderator: Dr. R. Del Delumyea, Director, Millar Wilson Laboratory for Chemical Research, Jacksonville University.

10:30 Moderator: R. Del Delumyea. Introduction of the Panel Members, "One Professor's Opinion of the Importance of Research at One Liberal Arts School".

10:40 Rep. Addie Green, Florida State Representative and Member, House Higher Education Commission. "Are Students Exposed to the Value System of Science and Do the Courses They Take Make the Connections Among Science, Technology and Society?"

- 11:00 Ms. Jean P. Williams, Director, In-Service Staff Development, Bureau of Teacher Education, Florida Department of Education.
- 11:20 Dr. Richard Hogg, Provost, Florida Agricultural and Mechanical University, representing 4-yr schools.
- 11:40 Dr. Randy Stovall, Assistant to the Dean of Academic Affairs, Valencia Community College, representing community colleges.

Evaluation of Environmental Problems of Minority Communities. 10:30 AM-12:00 PM, Saturday, March 26, 1994. Moderator: Dr. David Woodbridge, Health Physicist, College of Public Health, University of South Florida, Tampa. A study by the General Accounting Office has shown that four out of five hazardous waste sites in the Southeastern U.S. are located in, or adjacent to, minority communities. This session will evaluate the growing concern of environmental health situations within minority communities. Pollution problems and the need for remediation will be examined.

- 10:30 Moderator: Dr. David Woodbridge "The Need for Trained Minority Environmental Specialists to Remediate Environmental Conditions in Minority Communities."
- 10:50 Dr. Ram Nayar, Professor of Microbiology, Bethune-Cookman College, Daytona Beach. "The Impact of Hazardous Waste Sites on Minority Communities."
- 11:10 Dr. David Webb, Chair, Biology Department, Edward Waters College, Jacksonville. "The Effects of Vector Transport Within Minority Communities."
- 11:30 Group discussion of the topic and question and answer period.

SPECIAL SYMPOSIA

Agriculture-The Environmental Issue "Villain or Victim". Friday, March 25, 1994, 2:00-5:30 PM. Moderator: S. K. Pancholy, Florida A&M University.

Factors Influencing Instruction and Retention in Introductory Science Courses. Saturday, March 26, 1994, 8:30-10:00 AM. The goal of the Florida-Georgia Alliance for Minority Participation (FGAMP) in Science, Engineering and Mathematics is to increase significantly the enrollment, retention rate, and graduation rate of African-American, Hispanic, Native American, and other minority students majoring in undergraduate and graduate science, engineering and mathematics (SEM) disciplines. Specifically, the FGAMP project aims for a 200 percent increase in the graduation rate of SEM minority students by 1997. The FGAMP program comprises a unique alliance of twelve institutions in two states. Cooperating institutions are: Florida A&M University, Albany State College, Florida International University, Bethune-Cookman College, Florida State University, University of Central Florida, University of South Florida, University of Florida, Clark Atlanta University, Tallahassee Community College, Daytona Beach Community College, and Miami-Dade Community College. The project is funded jointly by the National Science Foundation and the participating institutions. Presentations will be made by members of the faculty, graduate and undergraduate students.

PROGRAM SUMMARY

THURSDAY AFTERNOON, MARCH 24, 1994

1:00	FAS Council Meeting.	Tucker 113
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THURSDAY EVENING, MARCH 24, 1994

6:30	FJAS Judging.	Tucker 113
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FRIDAY MORNING, MARCH 25, 1994

7:30	Registration (to 4:00 pm).	Tucker Lobby
8:00	Geology and Hydrology, Session A	Tucker 107
	Science Teaching	Tucker 104
8:30	Urban and Regional Planning.	Tucker 109
	Anthropological Sciences	Tucker 105
	Atmospheric and Oceanographic Science.	Tucker 205
	Biological Sciences, Session A	Tucker 207
8:55	Agricultural Sciences, Session A	Tucker 213
9:00	Biological Sciences, Session B	Tucker 209
	Social Sciences	Tucker 106
10:15	Florida Junior Academy Awards Ceremony	C.W.W. Theatre
10:30	PLENARY SESSION: The Future of Science Teaching in Florida	C.W.W. Theatre

FRIDAY AFTERNOON, MARCH 25, 1994

12:00	Academy Business Meeting	Tucker 113
12:30	Lunch and Poster Session until 2:00 pm (and 4:00-6:00 pm)	Tucker Lobby
1:45	Medical Sciences	Tucker 104
2:00	Agricultural Science, Session B, SYMPOSIUM.	C.W.W. Theatre
	Biological Sciences, Session C	Tucker 207
	Biological Sciences, Session D	Tucker 209
	Computer Sciences	Tucker 213
	Env. Chem. and Chem. Sci.	Tucker 105
	Florida Committee of Rare and Endangered Biota	Tucker 205
	Geology and Hydrology, Session B	Tucker 107
	Medical Sciences	Tucker 109
	Physical and Space Sciences	Tucker 106
4:00	Poster Session	Tucker Lobby

FRIDAY EVENING, MARCH 25, 1994

6:00	FAS/FAMU Faculty Social.	Grand Ballroom
6:30	Academy Social Hour	Grand Ballroom
7:30	Banquet.	Grand Ballroom
8:30	MEDALIST LECTURE	Grand Ballroom

SATURDAY MORNING, MARCH 26, 1994

8:30	Factors Influencing Instruction and Retention in Introductory Science Courses. FGAMP	C.W.W. Theatre
8:45	Biological Sciences, Session E	Tucker 207
	Biological Sciences, Session F	Tucker 209
	Biological Sciences, Session G	Tucker 205
8:55	Agricultural Science, Session C	Tucker 213
10:30	PLENARY SESSION: Evaluation of Environmental Problems of Minority Communities.	C.W.W. Theatre
12:00	MEETING ADJOURNED	

AGRICULTURAL SCIENCE

Friday, March 25, 1994, 8:55 am - 12:30 pm, Tucker 213

SESSION A

Michael Hubbard, Florida A&M University, Presiding

8:55 am, WELCOME AND TOPIC INTRODUCTION

C. Gardner, Section Chair

9:00 am, AGR-1A

Utilization of Dairy Manure Effluent for Production of Corn, Small Grain, and Forage Over a Rhizoma Peanut Sod Based System. E.C. FRENCH (1), K.R. WOODARD (1), D.A. GRAETZ (2), G.M. PRINE (1), AND H.H. VAN HORN (3), (1) Agronomy, (2) Soil and Water Science, and (3) Dairy Science Department, IFAS, University of Florida, Gainesville, FL 32611. Research was initiated in 1993 to evaluate three cropping systems grown under a dairy effluent disposal irrigation system. Three multiple cropping systems were compared: (1) corn, forage sorghum, and rye rotation, (2) rhizoma peanut (RP) and overseeded rye, and (3) RP with overseeded corn and rye. Treatment 1 was seeded in conventionally tilled soil, while 2 and 3 in established RP (cv. Florigraze) sod. All systems received the same amount of effluent. The cropping systems were split into three subtreatments receiving (1) only effluent, (2) a low and (3) high level of applied nitrogen. System 1 dry matter silage yield for early season corn in the control (18.4 Mg ha^{-1}), low N (19.0 Mg ha^{-1}), and high N (19.7 Mg ha^{-1}) subtreatments were similar as were those for sorghum silage under the control (9.2 Mg ha^{-1}), low N (11.4 Mg ha^{-1}), and high N (11.0 Mg ha^{-1}) treatments. RP in system 2 did not respond to varied nitrogen, yielding 13.22 Mg ha^{-1} dry matter across treatments. Yields for system 3 were corn 18.8 and RP 4.9 Mg ha^{-1} for the control, corn 20.2 and RP 4.7 Mg ha^{-1} for low N, and corn 19.9 and RP 4.3 Mg ha^{-1} for high N.

9:15 am, AGR-2A

Leucaena as a Short Rotation Woody Energy Crop for Florida. G.M. PRINE AND T.V. CUNILIO, University of Florida, Agronomy Dept., Gainesville, FL 32611. Leucaena (*Leucaena sp.* mainly *leucocephala*) grows on moderate- to well-drained soils over the entire State of Florida. Top growth can be killed by severe winter freezes but may survive and continue growth next spring in mild winters. When top growth is killed the plants regenerate next spring from underground rootstocks. Twelve selected accessions from a 373 accession leucaena nursery planted in 1979 had an average annual stem dry matter yield of 31.4 Mg ha^{-1} over 4 harvest seasons in 1980's from annually regenerated stems. Beginning the spring of 1990, the winters were so mild that the large stems were not killed at Gainesville for next 4 growing seasons. In December 1993, most stems of the best accessions were over 7.5 m tall and had stems up to 14.5 cm dbh. The dry weight of plots from 4-year-old accessions with most complete stands and excellent biomass growth will be reported. Leucaena shows promise as an annual or short rotation woody biomass energy plant for lower South USA. The energy content of 1 Mg of bone dry leucaena stem is equal to about 123 gallons of number 2 diesel fuel.

9:30 am, AGR-3A

Mycotoxicosis in Horses: A Review. RICHARD ASQUITH AND JAN KIVIPELTO, University of Florida, 100 Animal Science Building, Gainesville, FL 32611. Poisoning of horses by mold-produced toxins is not a new disease entity and may have preceded man. Numerous historical accounts of mycotoxicoses affecting equids are in the literature and many of these reports are anecdotal which require interpretation of clinical findings rather than analysis of data from controlled research trials. Both types of reports will be discussed as to clinical manifestations as well as the metabolites produced by certain species of fungi.

9:45 am, AGR-4A

Use of Mass Selection (MS) and Recurrent Restricted Phenotypic Selection (RRPS) in the Genetic Improvement of Pearl Millet x Elephantgrass Hexaploid Hybrids. D.A. DIZ, S.C. SCHANK AND D.S. WOFFORD, University of Florida, IFAS, Dept. of Agronomy, Gainesville, FL 32611. Hybrids between pearl millet [*Pennisetum glaucum* (L.) R.Br] and elephantgrass [*Pennisetum purpureum* Schum.] are normally sterile triploids. With the doubling of chromosomes, we have obtained seed production at the hexaploid level. With the doubling of chromosomes, we have obtained seed production at the hexaploid level. In this study, we compare the progress using MS (mass selection) and RRPS (recurrent restricted phenotypic selection) breeding procedures. Realized heritability values were calculated for several traits to determine what proportion of the phenotypic variability was represented by genetic variability. To date, heritability values and other genetic parameters have not been published for these hybrids. After two cycles of selection RRPS was more effective than MS in improving the traits under selection. After two cycles of MS and RRPS, seed yield panicle⁻¹ increased 39% with either procedure. For seed yield plant⁻¹, there was a 63% increase relative to the source population, after two cycles of MS and RRPS, respectively. Realized heritabilities ranged from 0.11 for tillers plant⁻¹, to 0.5 for the leafiness index. The RRPS procedure is recommended because it was superior to the MS breeding technique.

10:00 am, BREAK**10:15 am - 12:30 pm****STUDENT AWARD COMPETITION**

K.H. Quesenberry, University of Florida, Moderator

10:15 am, AGR-5A

Purification and Characterization of a Methionine-rich Protein from Peanut. A. BOLQUES AND S.M. BASHA, Florida A&M University, Tallahassee, FL 32307. Total protein from defatted peanut meal was extracted and fractionated by gel filtration on Sephacryl S-200 column. Resulting methionine-rich protein (MRP) fraction (Peak III) was pooled, concentrated and rechromatographed on Sephacryl S-200 column. The MRP fraction was pooled, dialyzed and loaded onto a DEAE-cellulose column. Protein from the column was eluted using a linear NaCl gradient of 0 to 0.3 M. Purity of the MRP protein was confirmed by non-SDS and SDS-gel electrophoresis. The purified MRP was found to be composed of 2 polypeptides with molecular weights between 15 to

20 KDa. Amino acid analysis indicated that the protein is rich in methionine as well as cysteine. Additional characterization and submit purification are in progress. Supported by a grant from USDA/CSRS, Washington, D.C.

10:30 am, AGR-6A Growth Pattern and Compositional Changes in in vitro Grown Peanut Seeds. NAJLA M. JEANTY AND SHEIK M. BASHA, Florida A&M University, Tallahassee, FL 32307. Peanut seeds of different maturities were cultured in a modified Murashige and Skoog media to promote seed development in vitro. The cultured seeds were harvested at weekly intervals. Growth pattern was monitored by determining changes in the weight of the seed after harvest. The cultured seeds were freeze-dried, ground into a meal, changes in amino acids, sugar and protein content and composition were determined. Effect of water stress on peanut seed composition was also determined by transferring the week old seed cultures to a media containing different concentrations of mannitol (0.125M - 1M). After 7-10 days in the stress media, the seeds were harvested and analyzed. Data on growth pattern of the seed and the effect of stress on seed composition will be presented. Supported by a USDA/CSRS grant.

10:45 am, AGR-7A Composition and Characteristics of High-Molecular Weight Proteins from Peanuts. B. THORNTON AND S.M. BASHA, Florida A&M University, Tallahassee, FL 32307. Proteins were extracted from defatted peanut meal by homogenizing in a polytron homogenizer. The homogenate was centrifuged and the protein extracts were fractionated by loading on Sephacryl S-400 and Sephacryl S-300 columns. Resulting protein fractions were pooled, dialyzed and concentrated. The concentrated protein fractions with apparent molecular weights >200,000 were characterized by SDS gel electrophoresis, and amino acid analysis. Results showed that peak I and III contained cryoproteins. Electrophoresis data indicated wide differences in the polypeptide composition of the protein fractions. The protein fractions are being hydrolysed to determine their amino acid composition. Supported by a grant from USDA/CSRS, Washington, D.C.

11:00 am, AGR-8A Developmental Changes in Embryonic Axis of Peanut Seed. K.G. JONES AND S.M. BASHA, Florida A&M University, Tallahassee, FL 32307. Embryonic axes from peanut seed of different maturities were obtained, freeze-dried and ground. The meals were defatted and analyzed for amino acids, sugars and proteins. The data revealed qualitative as well as quantitative changes in the polypeptide composition of embryos with increasing maturity. Comparison with seed polypeptides revealed apparent similarities in their polypeptide composition. Embryonic axes are also being analyzed for sugars and amino acids to determine changes in their content and composition with increasing maturity. Supported by a grant from USAD/CSRS, Washington, D.C.

11:15 am, AGR-9A Optimization of Tissue Culture Medium for Plant Regeneration of Red Clover. YUYU S. POERBA AND K.H. QUESENBERRY, Dept. of Agronomy, University of Florida, Gainesville, FL 32611. Petioles from NEWRC red clover genotypes were used to optimize tissue culture medium for plant regeneration. In Exp. 1, six media systems were compared for their capacity to produce callus and shoots/somatic embryos in a three-step protocol using six genotypes of red clover. Callus and plant regeneration were different ($P < 0.05$) both among genotypes and media systems. The best regeneration response was observed with the media sequence B5C (B5 basal medium plus 2.0 mg/l each of NAA, 2,4-D, and kinetin); LSP (L2 basal medium plus 0.002 mg/l picloram and 0.2 mg/l BA); LSP, with genotype C34TC the most responsive. In Exp. 2, different combinations of auxin and cytokinin were tested for induction of callus and shoots/somatic embryos using 6 genotypes of red clover. Callus and plant regeneration responses were different ($P < 0.01$) both among genotypes and among media. Optimum regeneration was observed on L2C (L2 basal medium plus 2 mg/l each of NAA, 2,4-D, and kinetin); L2E6 basal medium plus 0.06 mg/l picloram and 0.1 mg/BA; L22 (L2 basal medium plus 0.2 mg/l NAA) with clover genotype C25TC the most responsive in this media protocol.

11:30 am, AGR-10A Protoplast Fusion in Grapes (Vitis Planch). S.A. LANGAIGNE AND JIANG LU, Center for Viticultural Sciences, Florida A&M University, Tallahassee, FL 32307. Protoplasts were isolated from leaves of Florida bunch grapes and muscadine grapes. Purification of protoplasts was done by sedimentation/centrifugation. Fusion of the bunch and muscadine grape protoplast was achieved by using polyethylene glycol as a fusing agent. Fusion was identified with a microscope, based on the morphological differences between the protoplasts from donor plants. Muscadine grape protoplasts are larger, with a more pronounced pigmentation.

11:45 am, AGR-11A Testing Genetic Variation Among Bunch and Muscadine Grapes Using RAPD Markers. X.P. QU AND J. LU, Center for Viticulture, Division of Agriculture, Florida A&M University, Tallahassee, FL 32307. There exist two very different types of grapes, known as bunch grapes (*Vitis vinifera*) and muscadine grapes (*Vitis rotundifolia*). These two kinds of grapes can be distinguished by morphological characteristics and they are also different in fruit quality and disease resistance. In this study, we use RAPD (random amplified polymorphism DNA) to test the genetic diversity within and between the bunch and muscadine grapes. Eight bunch grape cultivars and seven muscadine grape cultivars were used for RAPD analysis. High genetic diversities were found between bunch and muscadine grapes, while little variation was found bunch or muscadine cultivars.

12:00 pm, AGR-12A Corn Yield Prediction from Ear Leaf Measurements. M. CHIONA AND R.N. GALLAHER, University of Florida, Inst. Food & Agr. Sci., Agronomy Dept., Gainesville, FL 32611. Crop growth models often require the measurements of leaf-area. The objective of this study was to determine the relationship

between corn (*Zea mays*) ear leaf measurements (area, weight, and N concentration), whole plant dry matter measurements (at tasselling and harvest) and leaf area index (LAI) with a view of substituting ear leaf measurements for LAI. Five conventional tillage and no-tillage management regimes were employed as main treatments with five levels of inorganic N as split plots, replicated four times. Data collected at silking showed a positive relationship between ear leaf area and LAI ($r^2=0.94$). At harvest ear leaf area, dry weight, and N concentration were highly correlated with whole plant dry matter and grain yields. These data suggest a strong possibility of substituting LAI by ear leaf area, dry weight, and/or N concentration in studies and models requiring leaf area indices.

12:15 pm, AGR-13A Photosensitivity in a Set of Experimental Tropical Corn Synthetics. S.J. EDME, R.N. GALLAHER AND M. CHIONA, University of Florida Institute of Food & Agr. Sci., Agronomy Dept., Gainesville, FL 32611. Photoperiod sensitivity is a critical determinate for corn (*Zea mays* L.) production. Two experiments were conducted (one in Gainesville, FL and one in Waynesboro, TN) in the Spring of 1993 to study the photosensitivity of a set of experimental synthetics from the Florida breeding program. Twelve cultivars (synthetics and hybrids) were planted in randomized complete block designs with 10 replications, and analyzed for a sensitivity index, tassel initiation, grain yield, total plant dry matter, harvest index, leaf area index, plant and ear height. The plants grew taller in Tennessee than in Florida by about 1.00 meter difference. Reductions in grain yield harvest index were observed in Tennessee due to pollination difficulties, smut and drought during pollination. The hybrids performed better than the synthetics. Leaf area indices were higher for the tropical cultivars as compared to the temperate hybrids.

JUDGES:

Outstanding Student Award

Mr. Jerome James, FAMU
Dr. K.C. French, IFAS-UF
Dr. Ivan D. Teare, IFAS-UF
Dr. Ron Jones, FIU

Sioma Xi Award

Dr. Gordon Prine, IFAS-UF
Dr. Joseph Orsenigo, ECI-AGRA, Inc.
Dr. Noor S. Tietze, FAMU
Dr. Dreamal Worthen, FAMU

12:30 pm - 1:30 pm

LUNCH

Friday, March 25, 1994, 2:00 pm - 5:45 pm, C.W.W. Theatre
SESSION B

C. Gardner, Presiding

2:00 pm - 5:30 pm - SYMPOSIUM: Agriculture

The Environmental Issue "Villain or Victim"

S.K. Pancholy, Florida A&M University, Moderator

2:00 pm, WELCOME AND INTRODUCTION**C. Gardner, Section Chair**

2:10 pm, AGR-16B Sustainable Florida - A Promising Agribusiness/Environmental Partnership. BERNIE YOKEL, Florida Audubon Society. (Abstract not available).

2:30 pm, AGR-14B Agriculture and the Everglades - A Medley of Dogma, Fact, Fancy, and Myth. JOSEPH R. ORSENIGO, SCI-AGRA, Inc., P.O. Box 1089, Belle Glade, FL 33430-1089. This presentation reviews the historic and contemporary aspects of the socio-political and scientific controversy over the Everglades. Issues included are: the Everglades and Everglades National Parks entities; the evolution of south Florida drainage, flood control, and water management projects; the evolution of organic soil agriculture and the Everglades Agricultural Area; the response of downstream biota to drainage components; the role of phosphorous; and, the implications of mercury loadings to the ecosystem.

2:50 pm, AGR-15B Protecting the Everglades: The Role of Science. F.T. IZUNO, University of Florida, Everglades Research and Education Center, P.O. Box 8003, Belle Glade, FL 33430. The Everglades Agricultural Area (EAA) in south Florida is a productive parcel of drained organic soils located between Lake Okeechobee and the Water Conservation Areas (WCAs). The flow of agricultural drainage water (carrying approximately 200 MT phosphorous/year) south to the WCAs, and on to the Everglades National Park, is alleged to be the cause of undesirable changes in the flora and fauna. Legal and political agendas of the federal and state governments, the environmental activists, and the growers, cloud the issues and impede the development of scientifically sound solutions. A potential solution relies on "best management practices" (BMPs) for water and fertilizer management at the farm level to reduce annual phosphorous loading by from 20% to 60%. However, BMPs come with higher levels of risk and require higher levels of management.

3:10 pm, AGR-20B Phosphorous Transformation and Release from Everglades Soils and Downstream Effects. RON JONES, Florida International University, Miami, FL 33199. (Abstract not available).

3:30 pm, AGR-31B Past, Present, & Future of the Everglades Ecosystem. TOM FONTAINE, South Florida Water Management. (Abstract not available).

3:50 pm, AGR-17B (Abstract not available). TOM ATKINSON, Florida Dept. of Environmental Regulation.

4:10 pm, AGR-18B Utilizing Dairy Waste and Yard Waste Compost for Crop Production. R.N. GALLAHER, University of Florida, Inst. Food & Agr. Sci., Agronomy Dept., Gainesville, FL 32611. Both animal waste and yard waste have potential benefits

for utilization in crop production. Dairy manure effluent from seven north Florida dairies and nine forage crop sprayfields was analyzed for N and P. Response of crops and changes in soil properties was determined from use of yard waste compost in on-farm and experiment station tests. Concentration of different forms of N and for P in dairy effluent was site specific, likely due to differences in wastewater and manure handling and disposal systems and herd size. Filtered NH_4^+ levels were 40% to 85% of total Kjeldahl in unfiltered samples. It was estimated that farmers were underfertilizing forages with N and applying about the right amount or slight excesses of P using dairy effluent. Yard waste compost increased soil organic matter, reduced root knot nematodes (Meloidogyne incognita) and improved corn (Zea maise) yield.

4:30 pm, AGR-19B

Applying Non-Hazardous Wastes to Land--Completing the Cycle. GERALD KIDDER, University of Florida, Gainesville, FL 32611. Taking care of wastes in ways that meet societal expectations is a challenge, to say the least. Among the concerns which must be considered are aesthetics, economics, energy expenditure, and protection of health, water, other natural resources, and property values. Applying wastes to land is an ancient process which is getting renewed attention because it meets many of the criteria for waste disposal while utilizing the resources in wastes. Since much of our wastes originated from the land, returning them to the land completes a natural cycle. Management of the processes is vital for meeting the waste disposal expectations of the public and the resource recovery potential of land application of wastes. Biosolids (sewage sludge), reclaimed water (wastewater effluent), animal manures, landscape wastes, food processing and handling wastes, and composted and processed municipal solid waste are materials which are being successfully land applied. Recent changes in EPA regulations on biosolids strongly encourage beneficial utilization. Waste reduction is also an important component of waste management.

4:50 pm, AGR-21B

An Alternative for Florida Agriculture? P.F. MONAGHAN, M.E. SWISHER, AND G.A. BRINEN, Home Economics Department, P.O. Box 110310, University of Florida, Gainesville, FL 32611. We surveyed commercial organic vegetable and citrus producers using funds provided by the Florida Energy Extension Service using producer lists provided by the Florida Organic Growers and the Organic Crop Improvement Association. We describe the production practices used by these growers and examine whether organic nutrient and pest management systems represent viable alternatives for Florida agriculture. Our discussion focuses on the availability and cost of non-synthetic nutrients, issues of scale, and the role of geographic isolation and its role in protecting organic systems. We conclude with a discussion of the potential benefits and problems of organic production.

5:10 pm, AGR-22B

Florida Tomato and Sweet Corn Producers: Are They Moving Toward Sustainability? M.E. SWISHER AND E. BASTIDAS, Home Economics Department, P.O. Box 110310, University of Florida, Gainesville, FL 32611. Commercial sweet corn and tomato producers were surveyed throughout the state with the objective

of determining the degree to which they have adopted production practices which will reduce undesirable environmental impacts. The survey focused on water, pest, and nutrient management practices. We describe changes in production practices that have occurred over the past decade. We examine the relationship between scale of production (size of production unit) and adoption of recommended practices and examine the degree to which scale serves as a predictor of adoption.

5:30 pm

SECTION MEETING

Cassell Gardner, Florida A&M University, Presiding

Saturday, March 26, 1994, 8:55 am - 10:15 am, Tucker 213

SESSION C

Michael Hubbard, Florida A&M University, Presiding

8:55 am, WELCOME AND INTRODUCTION

C. Gardner, Section Chair

9:00 am, AGR-23C Adjusting Grain Yield of Bird Damaged Pearl Millet. D.L. WRIGHT (1), I.D. TEARE (1), AND J.A. PUDELKO (2), (1) North Florida Research and Education Center, University of Florida, Quincy, FL 32351, (2) Agric. University Inst. of Soil Cult. and Plant Prod., Mazowiecka 45/46, 60-623 Poznan', Poland. Pearl Millet [*Pennisetum glaucum* (L.)] is highly susceptible to bird [red winged blackbirds, *Agelaius phoeniceus*] damage in small plots during the soft dough stage. Our objective was to predict pearl millet grain yield from yield component measurements with linear regression. This research was conducted on a Norfolk sandy loam with HGM-100 (W.W. Hanna, Tifton, GA) pearl millet hybrid. A simple linear equation is presented for predicting grain head yields: $Y = 6.98 + 191.22 X$, where Y = pearl millet head yield and X = head length ($P < 0.0001$).

9:15 am, AGR-24C Pearl Millet Head Length in Relation to Stress. I.D. TEARE (1), D.L. WRIGHT (1), AND J.A. PUDELKO (2), (1) North Florida Research and Education Center, University of Florida, Quincy, FL 32351, (2) Agric. Univ. Institute of Soil Culture and Plant Production, Mazowiecka 45/46, 60-623 Poznan', Poland. Pearl Millet [*Pennisetum glaucum* (L.)] head length is highly correlated with grain yield. Our objective was to measure pearl millet head length changes in relation to three induced stressors: (1) Date of planting/soil water stress, (2) Herbicide stress, and (3) Plant density stress. This research was conducted on a Norfolk sandy loam with HGM-100 pearl millet hybrid. Head lengths for 5 May, 15 May, and 15 June plantings accurately predicted grain head yields, but 15 July planting produced less and smaller seed with long heads. Herbicides significantly ($P = 0.05$) increased head length. Head length was significantly related to population density ($P = 0.01$).

9:30 am, AGR-25C Identification and Characterization of Protein(s) Associated with Off-flavors or Roasted Peanut. S.M. BASHA (1) AND C.T. YOUNG (2), (1) Florida A&M University, Tallahassee, FL 32307, (2) Dept. of Food Science, N.C. State University, Raleigh, NC 27695. Free amino acids and free sugars are the major flavor precursors in roasted peanuts. They give rise to desirable or off-flavors depending upon the amino acids involved in the sugar-amine reaction. To identify protein(s) associated with off-flavor production, seed proteins were separated into 10 fractions, and heated at 150°C with peanut oil and sucrose. Headspace was collected and injected into a GC to obtain volatile profiles. The data revealed that of the ten protein fractions only fraction I produced the off-flavor volatile compounds. Additional studies are in progress to isolate and identify specific protein(s) responsible for off-flavor development. Supported by a USDA/CSRS grant.

9:45 am, AGR-26C Mass Recovery of Malathion in Simulated Open Field Mosquito Adulticide Tests. NOOR S. TIETZE, John A. Mulrennan, Sr. Research Laboratory, Florida A&M University, Panama City, FL 32405. The mosquito adulticide, malathion was studied in terms of deposition as a function of distance from the point of application in an open area. Five separate field tests yielded decreasing mass of malathion deposited with distance from the spray head. Malathion deposits only differed significantly between the 500m site and the 3 closer sites ($df=3$; $F\text{-value}=3.42$; $P<0.05$). Although droplet abundance decreased with distance from the spray head, no significant differences were detected between distances. Significant differences in droplet size were found between the 500m site and the remaining 3 sites using orthogonal contract analysis ($df=1$; $F\text{-value}=9.5$; $P=0.009$). Compared to an expected field concentration of 577 ng/cm², empirical data yielded a maximum of 33.4 ng/cm² or 5.8% of the expected mass 5m from the spray head.

10:00 am, BREAK

10:15 am - 11:30 am

A.U. Onokpise, Moderator

10:15 am, AGR-27C Urban Mosquitos and the Release of *Toxorhynchites splendens*, a Predacious Mosquito, for their Control. ERIC T. SCHREIBER (1) AND C.J. JONES (2), (1) John A. Mulrennan, Sr. Research Laboratory, Florida A&M University, Panama City, FL 32405, (2) Dept. of Veterinary Pathobiology, University of Illinois, 2001 S. Lincoln Ave., Urbana, IL 61801. Urban mosquitoes which develop in a variety of natural and artificial containers, are poorly controlled using conventional chemical control practices. The use of selected biocontrol agents which target these habitats, is an area of worldwide focus, since many of the mosquito species are of public health importance. One candidate species for control of these medically important mosquitoes is a predacious mosquito *Toxorhynchites splendens*. Evaluation of field releases in Sarasota and Tallahassee, FL have been conducted with poor results. Reasons for their apparent failure are explored.

10:30 am, AGR-28C Reproductive Performance and Tocopherol Status in Gestating Gilts Injected with Vitamin A and Supplemented with Dietary Vitamin E. L.E. ANDERSON (1), R.O. MYER (2), J.H. BRENDEMUHL (2), AND L.R. MCDOWELL (2), (1) Florida A&M University, Tallahassee, FL, (2) University of Florida, Gainesville, FL 32611. Thirty-two crossbred gilts in a 2 x 2 trial were fed corn soybean-meal based diets supplemented with dl- α -tocopheryl acetate to provide either 25 or 500 IU of added vitamin E/kg of diet. Gilts were fed 1.9 kg/hd/d beginning 7-d prebreeding through d 25 of gestation. Half of the gilts were also injected with 350,000 IU of retinol palmitate at 7-d prebreeding, breeding and 7-d post-breeding. Reproductive performance was not affected by treatment. Increasing dietary levels of vitamin E increased blood serum and tissue tocopherol levels ($P < .01$). Vitamin A injections had little or no effect on these levels.

10:45 am, AGR-29C The Meat Goat Enterprise in North Florida: An Update on Marketing Strategies. P.A. MILLER, Florida A&M University, Martin Luther King Blvd., Tallahassee, 32307. Raising meat goats is a viable alternative enterprise for North Florida small farmers, complementing traditional agriculture and making use of marginal or non-arable farmland. Demand for goat meat in Florida is growing, and there is an opportunity for farmers to provide a commodity which is currently imported from other states. A history of the goat meat enterprise in North Florida from 1985 to present is described. Market survey results and a focus on Florida's increasing ethnic population determined early marketing strategies. Now cost factors and a changing customer base require the small producer to improve resource management and consumer awareness to compete successfully for the market.

11:00 am, AGR-30C Career Aspirations of Agricultural Sciences Students at Florida A&M University. Z.I. OLORUNNIPA, Dept. of Agribusiness, 302 Perry-Paige, Florida A&M University, Tallahassee, FL 32307. A thorough knowledge of students' career aspirations can be a useful planning tool in designing appropriate agricultural curricular as well as in counselling students regarding career choices. A survey of career aspirations of agriculture students was conducted in this study. The study indicates that most students are in agricultural study programs consistent with their career aspirations. However, there were instances in which students were not very sure of careers to which their study programs would lead. Salary was indicated as the most important determinant of the final choice of careers. Willingness to deviate from initial career aspirations would be weighed against the opportunity costs involved.

ANTHROPOLOGICAL SCIENCES

Friday, March 25, 1994, 8:30 am - 10:15 am, Tucker 105

J. Neil Henderson, U.S.F. Mental Health Center, Presiding

8:30 am, ANS-1 Variation, Perceptual Differences, and Tanning Ranges in Reflectance Spectrophotometer Readings of Florida Undergraduate Students. SUSAN E. STANS, Dept. of Anthropology, University of Florida, Gainesville, FL 32611. Skin color has been used to reinforce social categories of race. Binary oppositions in the mind enhance classification of people into discrete units. In reality the range of variation between groups belies the polar classification process. This research created a set of graphics useable as teaching aids to show the range and overlap of ethnic categories of skin reflectance to appropriate reading scales for Sunbelt college students. Results show that changes since previous research may be linked to current life style and geographic region. Also, the student's perception of their own skin shade was compared with the average readings for their ethnic group. Variation and tanning range was measured in connection with group identity, sex, hair color, eye color, and season. Students (N=497) voluntarily submitted readings from the medial surface of the upper arm and the forehead from laboratory exercises using the Photovolt Spectrophotometer.

8:45 am, ANS-2 Basque Political Symbols. JOHN P. LINSTROTH, Florida State University, P.O. Box 65567, Tallahassee, FL 32313. Basque nationalism is explored in depth, how the people of El Pais Vasco have maintained a sense of unity despite historical disfavor. Stemming from the extreme form of Basque nationalism, is terrorism, in many ways a product of poor economic conditions in the region. Basque nationalist ideologies seem to focus more on political and cultural oppression rather than the reality of unemployment. Political symbols, such as graffiti, political posters and other devices, are examined as to determine their relevance in rousing public sentiment. The Basque political symbols were used as a means of manipulating the urban populace studied into another consciousness for upholding the ideologies of the group that perpetuated their use. Vivid Basque symbols of nationalism retain a certain aura of nuninosity and are visible not only in the act of protest but in everyday life of the ongoing struggle for independence from the Spanish central government, becoming in a sense the symbols for the community written on walls.

9:00 am, ANS-3 The Gerontology of American Indian Epidemiology. J. NEIL HENDERSON, Suncoast Gerontology Center, University of South Florida Health Sciences Center, 12901 Bruce B. Downs Blvd., MDC Box 50, Tampa, FL 33612. Accepted epidemiologic patterns of American Indian elders requires reassessment. A gerontologic view of American Indian epidemiology and service implication is given. Conspicuously absent in most morbidity rosters, in view of the growing elderly population, is multi-infarct dementia (MID) which produces Alzheimer's-like symptoms. The prevalence rate of MID will rise due to more American Indians living into the ages of greatest risk. New

caregiving burdens and expenses will occur for which service systems and families are currently ill-prepared.

9:15 am, ANS-4 **Role Reversal on the Homefront: Leon County Women Take Command, 1940-1945.** MARY J. LE POER, 890 Timberlane Road, Tallahassee, FL 32312. With World War II, family values and role expectations for women changed—at least for the duration of the national crisis. Fourteen thousand soldiers were stationed near Tallahassee, resulting in unprecedented employment and demand for services. Females were trained in many previously male-dominated fields, and then accepted into the workforce, mothers included. Housewives were in demand as child care workers, plane-spotters, taxi drivers, Red Cross volunteers, entertainment club members, block wardens, and in many other capacities. By 1944-1945, however, as America appeared invincible, Leon County women seemed to lose interest in the war. Less participation was noticed in homefront war activities. After the war, life in Leon County returned to its pre-war pattern. Women again had few job opportunities as in 1940, and left work for marriage and motherhood. The way was being prepared for the idealized family life that would emerge in the 1950s.

9:30 am, ANS-5 **Primary Health Care for Elderly People in a Low-Income Multicultural Setting.** J.F. BEZON, University of South Florida College of Nursing, 12901 Bruce B. Downs Blvd., Tampa, FL 33612. The delivery of health promotion and disease preventive services to multi-cultural low-income elderly in a primary health care setting is examined with a focus on ethnic response to offered services. Discussed are the recommended services, service provider training, and numerical outcomes of care. Qualitative responses to services help to substantiate the outcomes.

9:45 am, ANS-6 **Between Research and Policy: An Applied Anthropologist's Perspective.** M. GUTIERREZ-MAYKA, Dept. of Child and Family Studies, FMHI, University of South Florida, Tampa, FL 33620. The gap between research and policy is examined from the perspective of the author and her involvement in social science research and policy implementation. The constraints to implementing research-based policies in the human services field are discussed. The role of advocacy as a bridge between "value-neutral" research and "politically-driven" policy is addressed.

10:00 am

SECTION MEETING

Marcela Gutierrez-Mayka, Children's Board of Hillsboro County, Presiding

ATMOSPHERIC AND OCEANOGRAPHIC SCIENCES

Friday, March 25, 1994, 8:30 am - 10:00 am, Tucker 205

Gary Zarillo, Florida Institute of Technology, Presiding

8:30 am, AOS-1

Florida's Desert Sand. GENEVIEVE IMHOFF AND R. DEL DELUMYEA, Millar Wilson Laboratory for Chemical Research, Jacksonville University, Jacksonville, FL 32211. "Air pollution" is a global problem and sometimes not of human origin. One of the six criteria pollutants the EPA requires be monitored by larger cities is Total Suspended Particulates (now PM₁₀). Occasionally, the appearance of the filters used to collect the samples changes from the normal black-gray to a tannish color. The tan color comes from small-sized (less than 2 microns) sand particles transported from the Sahara Desert during sandstorms across the Atlantic Ocean. Observations of over 3,000 samples collected in 13 widely spaced Florida counties in 1990 and 1991 provided a method to study the path of deposits from individual storms.

8:45 am, AOS-2

Persistence of Bunker C Fuel Oil Spilled from the Bouchard 155 Near Tampa Bay, Florida. D.L. WETZEL AND E.S. VAN VLEET, Dept. Marine Science, University of South Florida, St. Petersburg, FL 33701. Oil spilled near Tampa Bay, Florida, in August 1993 by the Bouchard 155 consisted of Bunker C fuel oil, a very viscous, heavy molecular weight oil of moderate toxicity and high persistence. The current study was undertaken to help assess damages from this spill by carrying out a time series study of the chemical fate of the Bunker C fuel oil under subtropical conditions. Sediment samples have been collected biweekly since the spill from Elinore Island (mangroves) and a nearby dredge spoil island (sand beaches) inside Boca Ciega Bay. These samples have been analyzed for hydrocarbons by high resolution gas chromatography and combined gas chromatography-mass spectrometry in order to assess the changes in chemical properties of the Bunker C oil. Results of the investigation are discussed and compared with similar spills reported in temperate environments.

9:00 am, AOS-3

A Comparison of the Benthic Infauna between an Impounded and a Natural Tidal Creek in Volusia County, Florida. D.J. KARLEN AND W.G. NELSON, Dept. of Oceanography, Florida Institute of Technology, Melbourne, FL 32901. The benthic infaunal community of an impounded salt marsh tidal creek (Lost Creek) was compared to that of a natural tidal creek (Ten Mile Creek) near New Smyrna Beach, Florida. The study was conducted prior to the reconnection of Lost Creek to adjacent tidal systems. A total of 39 taxa and 11,951 individuals were collected at Lost Creek compared with 77 taxa and 3,206 individuals at Ten Mile Creek. The infaunal abundance was significantly higher at Lost Creek than at Ten Mile Creek, but there was a significantly lower number of benthic taxa present. Both sites were dominated by the polychaete Streblospio benedicti. The amphipods Grandidierella bonnieroides and Corophium sp. ranked second at Lost Creek and Ten Mile Creek respectively.

9:15 am, AOS-4

Stargazer, An Interdisciplinary Field Oriented Training Site for Environmental Studies. WILLIAM TRANTHAM AND ROBERT W. SMITH, Biology Department, Business and Technology, Florida Keys Community College, 5901 West College Road, Key West, FL 33040. This paper will discuss the use of Stargazer, a biomorphic artistic submarine macro-sculpture, for training students enrolled in Marine Biology Technology and Recreational Dive Management. This 180x80 foot submarine sculpture located on a sediment apron at a dept of 18 feet combines a refuse for diverse marine populations with an ideal training location without negatively impacting the surrounding oceanic reef system.

9:30 am, AOS-5

Controls on Salinity Structure of a Subtropical Lagoon. G.A. ZARILLO, A. MILITELLO AND C.R. SURAK, Department of Oceanography, Florida Institute of Technology, Melbourne, FL 32901. Episodic freshwater discharge alters the salinity structure of the Indian River Lagoon by causing severe abrupt decreases in salinity followed by gradual recovery back to quasi-steady state. A statistical analysis of time series data obtained during the wet season (summer) of 1992 was performed to examine process-response and dominance of forcings. Cross-correlation methods were combined with stepwise multiple linear regression methods to form a statistical model to predict salinity from time series of meteorological, water level, and flow velocity. Analysis of observations at six stations in the estuary indicates that freshwater discharge, atmospheric pressure, and water temperature are all strongly correlated to salinity.

9:45 am**SECTION MEETING**

Gary Zarillo, Florida Institute of Technology, Presiding

BIOLOGICAL SCIENCES

Friday, March 25, 1994, 8:30 am - 10:30 am, Tucker 207

SESSION A - Plant Ecology

Patricia Dooris, University of South Florida, Presiding

8:30 am, BIO-1A

Introduction to the Ethnobotany of the Chachi in an Ecuadorian Rain Forest. JAMES N. BURCH AND BRADLEY C. BENNETT, Dept. of Biological Sciences, Florida International University, Miami, FL 33193. The Chachi are people indigenous to the tropical rain forest of western Ecuador, south of the Choco region of Colombia. Our work has two foci. The first is a qualitative ethnobotanical study, in which we have begun to inventory and identify flora in the region, and to record uses of these plants by the Chachi. The second is a quantitative survey of two permanent 1 ha. plots. Chachi collaborators have provided names and uses of trees within these plots. Both surveys will be repeated with other Chachi colleagues, and the permanent plots will continue to provide information in the future.

8:45 am, BIO-2A

An Analysis of the Vegetation at Turtle Mound (Volusia County): Twenty Years Later. S.S. HAWLEY AND E.M. NORMA, Dept. of Biology, Stetson University, DeLand, FL 32720. Turtle Mound, located 8 miles south of New Smyrna Beach, is a shell midden built by the Timucua Indians. Its vegetation and soil were studied in 1971-73 and again twenty years later. Recent severe freezes have led to the disappearance of several tropical species which were at or near their northern limit. These include the following taxa: Cereus gracilis var. simpsonii; Exothea paniculata; Mastichondendron foetidissimum; Ocotea coriacea; and Schoepfia chrysophylloides. However, frequency of Myrcianthes fragrans has increased along with several vines, Cissus trifoliata, Cynanchum scoparium, Parthenocissus quinquefolia, and Ipomea indica.

9:00 am, BIO-3A

Love Vine Parasitism of Brazilian Pepper in Southern Florida. JAMES N. BURCH, Florida International University, Miami, FL 33199. In the past few decades Brazilian pepper (Schinus terebinthifolius) has become established as an aggressive exotic in southern Florida, and may be found dominating many areas (especially disturbed areas) here. Recently a native angiosperm, love vine (Cassytha filiformis), has been noted parasitizing Schinus. In some parts of Schinus' range, love vine parasitism appears to significantly affect its growth and reproduction. Adaptations and parasitic interactions of Cassytha are described; data are presented indicating differences in Schinus' growth and reproduction when parasitized by love vine.

9:15 am, BIO-4A

Aquatic Heterophylly in Melaleuca quinquenervia. C. LOCKHART, Dept. of Biology, Florida Atlantic University, Boca Raton, FL. Melaleuca quinquenervia (Cav.) Blake is an emergent aquatic/semi-aquatic invasive tree whose plasticity allows it to invade terrestrial habitats. While studying the hydroperiod of Melaleuca seedlings, a distinct change in leaf morphology of submersed leaves was observed. Submersed leaves had a linear, rosette appearance which changed to a stout, transitional leaf form as the seedlings approached the surface of the water. Stomate counts, leaf length to width ratios and area, and internodal distances were examined. Their characteristics are similar to other aquatic heterophyllic plants that grow in areas where water levels tend to fluctuate.

9:30 am, BIO-5A

A Simulation Model of Typha latifolia Growth with Above and Below Ground Storages and Light Competition. D.L. DAY AND C. MONTAGUE, Center for Wetlands & Water Resources, University of Florida, Gainesville, FL 32602. A dynamic simulation model of Typha latifolia growth was constructed to gain insight into possible management strategies. Above and below ground storages were considered as well as light competition between photosynthetic biomass and standing or fallen dead biomass. The model agreed well with the time patterns being considered. The hypothesis represented in the model suggests possible management strategies. First, burning late in the season was contraindicated. Second, herbicide treatments should be applied when below ground storage is at its lowest. Finally, standing and fallen dead appeared to compete against new shoots. This increased the use of below ground storages to outcompete the standing or fallen dead.

9:45 am, BIO-6A Lichen Lines, Cypress Knees, and Palmetto Lines as Indicators of Long-Term Water Levels in North Central Florida. S.J. DOHERTY AND M.T. BROWN, Department of Env. Eng. Sci. and Center for Wetlands and Water Resources, University of Florida, Gainesville, FL 32611. Elevations of shoreline features were measured on 4 lakes and 2 streams and related to long-term USGS surface water stage records. Average elevations above mean water level for lichen lines, palmetto lines and cypress knees measured 0.808, 0.713, and 0.695 m, respectively. Lichen line elevations corresponded to the upper 10% flood duration elevation and knee heights were correlated with mean high water. Stream and lake margin sites showed significant differences in mean heights of measured parameters. Streams had a greater range of water level fluctuation and shorter period of flooding producing lower percent time of inundation with deeper mean and maximum inundation depths resulting in higher elevations of knees and lichen lines. Lichen lines are better indicators of water levels for the recent past (15 years) while cypress knees are more reliable indicators of long-term water levels. The palmetto line appears not to be a reliable indicator of long or short term water levels.

10:00 am, BIO-7A What is the Adaptive Significance of Extracellular Accumulations of Mucilage in Watershield, Brasenia scherberi Gmelin? D.J. SPENCE AND L.A. BISHOP, Biology Dept., Stetson University, DeLand, FL 32720. Watershield (Cabombaceae) is a common aquatic plant in both temperate and tropical areas. Its young leaves and buds are covered by a thick layer of mucilage. We experimentally determined if this mucilage deters herbivores or inhibits competitors through allelopathy. Removal of mucilage on leaves and buds resulted in higher rates of herbivory than were observed on unmanipulated plant parts. The presence of B. scherberi leaves, leaves without mucilage, or mucilage alone had no significant effect on survival of Lemna minor. We believe mucilage deters herbivory and has no apparent allelopathic effects.

10:15 am

SECTION MEETING

Friday, March 25, 1994, 9:00 am - 10:30 am, Tucker 209

SESSION B - Marine Ecology I

Linette Padmore, Florida A&M University, Presiding

9:00 am, BIO-8B The Disappearance of Rocky Intertidal Communities in the Florida Keys. G.A. DELGADO AND K.M. SULLIVAN, The Nature Conservancy, Florida and Caribbean Marine Conservation Science Center, P.O. Box 249118, Coral Gables, FL 33124. Rocky intertidal communities at eleven sites in the Florida Keys were characterized and assessed. A review of data on historical rocky intertidal areas allowed a comparison to the remaining intertidal areas. Species lists were compiled at each of the sites and compared to each other and to previous studies using similarity matrices. Species abundance was also used to compare sites to determine if densities are influenced by anthropogenic factors or are correlated to different community types. A community

classification system has been developed to determine discreet communities from each other.

9:15 am, BIO-9B Abundance of Scleractinian Coral Recruits in Relation to the Parental Coral Community on Floridian Reefs. M. CHIAPPONE AND K.M. SULLIVAN, The Nature Conservancy, Florida and Caribbean Marine Conservation Science Center, P.O. Box 249118, Coral Gables, FL 33124. The abundance of scleractinian coral recruits was recorded on nine reef sites representing three reef types in the Florida Keys: (1) high-relief spur-and-groove reefs, (2) transitional reefs, and (3) low-relief spur-and-groove reefs. Recruits were identified and counted in belt quadrant surveys and compared to density and coverage of parental corals and algal coverage. Significant differences in recruit density were observed; valued ranged from 1.64 to 5.54 colonies m⁻². Recruit abundance was not significantly correlated to coral cover or algal cover. Recruits comprised between 19.5 and 57.6% of the total coral population density on reefs. Recruit abundance on high-relief spur-and-groove reefs and transitional reefs was dominated by *Agaricia agaricites* and *Favia fragum*. Recruit abundance on deeper, low-relief spur-and-groove reefs was dominated by *Porites astreoides*, *P. porites* and *Montastraea cavernosa*. The abundance patterns of recruits are discussed in terms of: (1) the life history strategies of coral species and (2) reef community structure. The effect of these two attributes on the colonization of reef corals on Floridian reefs is discussed.

9:30 am, BIO-10B Community Structure of Fishes at Two Reef Sites in John Pennekamp State Park. E.F. SCHMITT AND K.M. SULLIVAN, Department of Biology, University of Miami, P.O. Box 249118, Coral Gables, FL 33124. During July of 1993, volunteer and technical observers working with the Reef Environmental Education Foundation (R.E.E.F.) and The Nature Conservancy visited two reef sites in the Florida Keys within John Pennekamp State Park. Carysfort Reef is situated in deeper water near the norther boundary of the Park while Little Grecian is situated in shallower water and is centrally located within the Park. Using SCUBA, the observers recorded all fish species present and their abundance categories of 1, 2-10, 11-99 and >100. This visual census data provides a means for characterizing the fish community and examining the ecology of fishes on these two Florida coral reefs. Fishes seen at these reef sites can be divided into three functional categories: generalists, reef specialists, and incidental fish. The ecology of fishes as represented by these three functional categories is discussed.

9:45 am, BIO-11B Sexual Heterodonty Correlates with Mating Season in the Atlantic Stingray, Dasyatis sabina. STEPHEN M. KAJIURA, Dept. Biological Sciences, Florida Institute of Technology, Melbourne, FL 32901. Although dental dimorphism among sexes exist for many skates and rays, the temporal dynamics of this phenomenon were previously unknown. Tooth shape and size of sexually mature Atlantic stingrays, Dasyatis sabina, in the Indian River Lagoon were quantified for 129 males and 128 females over a consecutive 22 month period. Tooth shape in male rays is recurved and extremely sharp during the mating period but transitions to a distinctly rounded and

flattened (molariform) shape in the non-mating season. In contract, females retain a molariform shape year round. It is hypothesized that the seasonal dynamics of sexual dental dimorphism in D. sabina has evolved in response to selection for feeding efficiency on benthic invertebrates and intrasexual competition among males which must grasp their mate during courtship and copulation. This work was funded in part by a grant from Sigma Xi.

10:00 am, BIO-12B Environmental Impact Assessment of Landfill on the Surrounding Mangrove Ecosystem, Perseverance, Grenada: Effect on Water Quality. VALMA R. JESSAMY, University of Florida, Dept. of Environmental Engineering Sciences, Gainesville, FL 32611. It has been a common practice in Grenada and many other Caribbean islands to dispose of solid waste in mangrove swamps. To date, there have been no studies concerning the impact of this practice on these systems. A survey of water quality was conducted to assess the impacts of leachate from a landfill located adjacent to the mangrove swamp at Perseverance, Grenada. There was no significant variation in water quality along Salle River which flows through the mangrove ecosystem and into Halifax Harbor. There is evidence that mangroves are processing leachate from the landfill and this may explain the lack of variation in water quality. The landfill seems to have no adverse effects on water quality leaving the mangrove swamp. Partial funding and volunteers were provided by the Foundation for Field Research, Alpine, CA.

10:15 am

SECTION MEETING

Friday, March 25, 1994, 2:00 pm - 4:30 pm, Tucker 207

SESSION C - Ecology/Environmental Biology

Tom Crisman, University of Florida, Presiding

2:00 pm, BIO-13C Materials Toward a History of Florida Aquatic Biology. THOMAS SAVAGE, Florida Department of Environmental Protection, Tallahassee, FL 32301. A bibliography of approximately 1500 individually selected citations dealing specifically with Florida's aquatic biology, developed as a technical support document, lead to an inquiry into the development of the study of the natural history of Florida's freshwater aquatic ecosystems. The database includes citations from the 1700's to the present. Using citation analysis techniques, some patterns emerge and others will as citations are added to the database. Through the use of computer techniques, the prominence of researchers and research subjects can be demonstrated, as can that of journals.

2:15 pm, BIO-14C Desiccation Tolerance of Adult and Hatchling Florida Applesnails. R.L. TURNER AND S.E. MCCAFFREE, Dept. Biol. Sciences, Florida Institute of Technology, Melbourne, FL 32901. Applesnails often live in aquatic habitats prone to drought, and some species have capacities of aestivation. Florida applesnails

(Pomacea paludosa) are thought to have this ability; our study tested this assumption by exposing adult and hatchling snails to fully aerial exposure or to water-saturated sand under approximate ambient temperature and humidity. In four trials, most adults died after 7-29 d of full exposure; none secreted an epiphragm. In one trial, survival increased from 3% under full exposure to 13% on saturated sand. Fully exposed hatchlings (1-2 d old) survived up to 16 h, but only 1% survived 24 h of exposure. Saturated sand improved survival to 36 h, after which survival declined to 6% by 96 h. The ability of P. paludosa to resist drought is unimpressive compared to its congeners. Hydrological management of Florida wetlands for predators of this snail must consider the snail's poor capacity for aestivation. (Supported by contract 91D192 from St. Johns River Water Management District).

2:30 pm, BIO-15C Bird Use of Cypress Ponds in North Central Florida. T.W. WORKMAN AND K.C. EWEL, School of Forest Resources and Conservation, 118 Newins-Ziegler Hall, University of Florida, Gainesville, FL 32611. Preharvest data were collected to compare bird populations in 9 cypress ponds varying in size and vegetation density. Comparisons with previous studies and analysis of variability among the swamps will provide a basis for assessing the potential impacts of harvesting cypress trees.

2:45 pm, BIO-16C A Review of Benthic Invertebrate Monitoring Data from Wetlands Constructed on Phosphate-mined Lands. G.W. BITTER, W.J. STREEVER AND T.L. CRISMAN, University of Florida, Department of Environmental Engineering Sciences, Gainesville, FL 32611. As part of a multi-faceted project, benthic invertebrate data from wetlands constructed on phosphate-mined lands are being assembled and analyzed to: (1) assess sampling methodology, (2) identify successional trends in constructed wetlands and (3) compare structural/functional attributes of constructed and natural systems. Several problems related to consistency in methodology hinder interpretation of the current database. Short-term temporal and sampling variance mask obvious successional trends. However, data suggest that invertebrate communities in constructed wetlands are at least superficially similar to those of natural wetlands. This research was funded by the Florida Institute of Phosphate Research.

3:00 pm, BREAK

3:15 pm, BIO-17C Vossia cuspidata and Salvinia molesta: Potential Invaders of Florida Natural and Restoration Sites. J. DOUGLAS OLIVER, Bur. Mine Reclamation, Florida Dept. Environmental Protection, Tallahassee, FL 32310. V. cuspidata, a floating and rooted plant that covers nearshore and deeper freshwater sites, has spread through warm areas of Asia and Africa. Mechanical control is not likely to be effective and prospects for herbicidal and biological control are unknown. If the plant enters Florida, it could dominate large areas in south and central parts of the state and could replace native plants. It could also invade restoration sites, such as those on spoils. S. molesta is a floating weed that has been reported in more than 20 countries, but is not now

established in the U.S. The plant disrupts access to water for humans, livestock, and wildlife; and recreation, transportation, irrigation, and flood control are hampered. Successful control by the salvinia weevil might only be feasible where growth is severely limited by environmental factors. Eutrophic habitats such as phosphate-mine restoration wetlands and ponds would be particularly suitable for rapid growth. *V. cuspidata* and *S. molesta* are expected to enter the U.S. and cover large areas unless they are continually excluded.

3:30 pm, BIO-18C Ecosystem Self-Organization in a Constructed Aquatic System Receiving Secondly Treated Wastewater Effluent. P.K. OWEN (1) AND MARK T. BROWN (2), (1) Dept. of Env. Eng. Sci., University of Florida, Gainesville, FL 32611. The purpose of this project was to evaluate the effect of physical and biological dynamics on groundwater infiltration in a created rapid infiltration basin designed as a water garden system within Kanapaha Botanical Gardens, Gainesville, FL. The basin receives secondarily treated wastewater from Kanapaha Water Reclamation Facility. The project evaluated groundwater infiltration capacity of soils, and the interaction between water quality and algal and benthic macroinvertebrate communities. A computer simulation and EMerger analysis of the system was developed to test theory and management strategies. Measurements and calculations suggested that infiltration rates decreased 80% possibly due to sediment accumulation. Total nitrogen concentration in water decreased 44% from the input to that measured in the surrounding groundwater monitoring wells. Low, nightly dissolved oxygen concentrations and lower benthic macroinvertebrate densities and Shannon-Weaver diversities were found in the second pond compared to the rest of the water garden system. The EMerger benefit/cost ratio was found to be 5.2/1.

3:45 pm, BIO-19C A Computer Simulation of the Atmosphere in Biosphere II. VICTOR ENGEL AND HOWARD T. ODUM, University of Florida, Dept. of Environmental Engineering Sciences, Gainesville, FL 32607. The Biosphere II is a 1.28 ha, 180,000 m³ materially closed facility designed to support a diverse assemblage of plants and animals, including humans. Analogs of several "biomes" were created within the facility, including a rainforest, desert, ocean, savannah, agriculture, and a human habitat. Computer simulation models for each biome were developed, and calibrated with approximate values for atmospheric, hydrological, and metabolic processes. When simulated, these models revealed the contributions of biotic and abiotic reactions in each biome to the oxygen and carbon dioxide balance in the shared atmosphere. Experiments on the models were designed to test the effects of (1) changing the soil buffering capacity, (2) letting plants capable of net production grow without restriction, and (3) changing the nutrient balance in the ocean. This research was supported by a grant from Space Biospheres Ventures.

4:00 pm, BIO-20C The Cryptoendolithic Microbial Community of the Antarctic Cold Desert. R. OCAMPO-FRIEDMANN, Biology Department, Florida A&M University, Tallahassee, FL 32307. The dry valley region of Southern Victoria Land,

Antarctica is characterized by extreme drought and cold parameters demanding the utmost capacity for an organism to live in. This is also regarded as the closest terrestrial analog to a martian environment. Sandstone rocks in the region are colonized by an unusual microbial community, most members of which have now been isolated and being studied. The existence of this community extends our knowledge of life's frontier and our understanding of the biology of the individual components gives us an insight as to how life forms survive in an extreme environment.

Friday, March 25, 1994, 2:00 pm - 3:45 pm, Tucker 209

SESSION D - Marine Ecology II

E.D. Estevez, Mote Marine Lab, Presiding

2:00 pm, BIO-22D

Species Composition and Spatial Distribution of Hermit Crabs in Tampa Bay, Florida and Surrounding Waters. K.M. DAVIS AND W. PRICE, University of Tampa, Tampa, FL 33606. Fourteen species of hermit crabs, belonging to five genera, were identified from Tampa Bay and adjacent continental shelf waters. Collections were taken using the following methods: dip netting, trawling, and hand collecting using SCUBA. The majority of the 84 collections, taken from the intertidal to 15m, consisted of species belonging to the genus *Pagurus*. *Pagurus maclaughlinae*, *p. longicarpus*, and *P. pollicaris* were the dominant species of the upper bay. Although these species were sympatric, they were commonly found in seagrass beds, sandy substrates, and sand/mud substrates respectively. The species *P. gymnodactylus*, *P. stimpsoni*, and *P. impressus* inhabited areas near hard substrate in the higher salinity waters. *P. stimpsoni* was also found with *Paguristes hummi* on the Gulf beaches of the lower bay and offshore on hard substrate. *Paguristes puncticeps*, *Paguristes sericeus*, and *Pagurus carolinensis* were collected only offshore on hard substrate. *Petrochirus diogenes* and *Paguristes* sp. were collected both offshore and in the lower bay waters. *Isocheles wurdmanni* appears to be restricted to high energy beaches. Detailed distributions and taxonomic problems of these species will be discussed.

2:15 pm, BIO-23D

Spatial and Temporal Differences in the Demersal Crustacean Assemblages of a Hardbottom Community in the Florida Keys: Sampling Adequacy of Demersal Plankton Light Traps. J.M. LEVY AND K.M. SULLIVAN, Dept. of Biology, University of Miami, P.O. Box 249118, Coral Gables, FL 33124. Demersal crustaceans inhabiting a nearshore, hardbottom community in the Florida Keys were sampled using demersal plankton light traps suspended in the water column. Benthic parameters (coverage and species composition of substrate and major benthic lifeforms) obtained from belt quadrant surveys were also recorded. Correlative comparisons between the crustacean species compositions of the traps and their corresponding benthic parameters were made. This allowed for spatial and temporal comparisons of the demersal crustacean community present as related to the quality of the benthos as a suitable refuge. The reliability of this sampling method for evaluating crustacean infauna in reef habitats, and its usefulness in predicting the abundance and diversity of crustaceans in defined reef

communities with limited sampling are discussed. The repeatability and sample size of demersal plankton light trap collections for crustacean infauna sampling and its value as a constant monitoring method are presented.

2:30 pm, BIO-24D

Phenotypic Plasticity and the Role of Parental Investment.

L.R. MCEDWARD AND S.K. MCWEENEY, University of Florida, Gainesville, FL 32611. Blastomere separation experiments were conducted on the sand dollar *Dendraster excentricus*. By manipulating the egg size, an evolved change in maternal investment was mimicked. Comparisons of larvae from full-size and half-size eggs were made at two nutritional levels: limited (1 cell/ l) and excess (5 cells/ l). The larvae from half-size eggs were smaller and developed at a slower rate than the full-size controls at a given food level. Lower food levels resulted in plastic growth (i.e., larger larvae with longer arms), but this effect was greatly reduced in larvae from experimentally reduced eggs. This suggests that the capacity of plasticity is dependent on the level of maternal reserves in the egg.

2:45 pm, BIO-25D

A Novel Larval Feeding Strategy for the Tropical Sand Dollar

Encope michelini. G.L. ECKERT, Dept. of Zoology, University of Florida, Gainesville, FL 32611. Most marine animals have complex life cycles with two stages: larva and adult. The duration of the larval stage depends on development time and nutritional requirements of the larva. Larvae of some species, called planktotrophs, need particulate food to develop into a full-sized larva and metamorphose, which takes several weeks. Others, called lecithotrophs, do not eat particulate food and develop within several hours or days using only maternal reserves provided in the egg. Larvae of the tropical sand dollar Encope michelini have a feeding strategy which is intermediate to planktotrophy and lecithotrophy. E. michelini larvae are able to develop into full-sized larvae in the absence of external food (i.e., only on maternal reserves). Subsequent development of the rudiment and metamorphosis into an adult are dependent on amount and timing of external food. Larvae of this species seem adapted to live in an environment in which food is patchy or scarce.

3:00 pm, BIO-26D

Maternal Effects Vs Phenotypic Plasticity in Larvae of the Sea Urchin

Lytechinus variegatus with Notes on the Heterochronic Development of the Juvenile Rudiment. J.C. HERRERA, University of Florida, 223 Bartram, Gainesville, FL 32611. Morphological measurements of Lytechinus variegatus (Toxopneustidae) larvae fed several levels of Dunaliella tertiolecta revealed little significant morphological plasticity of larval structures due to diet. Morphological differences were greater between larvae of urchins from different locations than from any differences in diet. These morphological differences may be due to site, season, or other material effects. L. variegatus larvae were reared at 27°C, and fed D. tertiolecta at 11 concentrations: 14, 12, 10, 8, 6, 4, 3, 2, 1, 0.5, or 0 cells/ l. A diet of D. tertiolecta at a level of 8 cells/ l was found to be unlimiting. Development of larvae fed unlimiting diets was very rapid at 27°C: 2-arm-pluteus, 1d; 4-pl, 2d; 6-pl, 5d; 8-pl, 6d. The rudiment first appeared at 9 days and larvae were competent

to metamorphose at 11 days. 3-D morphometric measurements of the body and skeleton were done on larvae from 2 sites at 5 food levels. In larvae fed diets of 8 cells/ 1 and above, a heterochronic shift in development is evidenced by the earlier appearance of a juvenile rudiment both in time and in relation to arm length. Supported by a grant from Sigma Xi, and a National Defense Science and Engineering Graduate Fellowship from the Office of Naval Research.

3:15 pm, BIO-27D

Morphogenesis, Ecology, and the Evolution of Starfish with Direct Development. DANIEL JANIES AND LARRY MCEDWARD, University of Florida, Zoology, Gainesville, FL 32611. Most starfish undergo indirect development via bilaterally symmetrical, pelagic larval stages. These larvae require a metamorphosis to become radially symmetrical, benthic juveniles and adults. However the starfish, *Pteraster tessellatus*, has direct development. Our study, using 3-d computer graphical reconstructions from serial sections, has shown that *P. tessellatus* is radially symmetrical throughout development, lacks all larval morphology, and does not undergo a metamorphosis. Although the morphogenesis of *P. tessellatus* is "adult," in an ecological sense the life history of *P. tessellatus* is "larval" because it is pelagic and dispersive. We are currently testing whether direct development evolved during a long phylogenetic history of benthic brooding in the sister taxa of *P. tessellatus* or alternatively as an adaptation for the re-evolution of a pelagic period as seen in *P. tessellatus*. These hypotheses provide means of investigating the role of the evolution of morphogenesis in the important ecological transition from a nondispersive to a dispersive life history.

3:30 pm, BIO-28D

Dynamics of Fish Populations in St. Marks Estuary, Florida. C.B. SUBRAHMANYAM, Department of Biology, Florida A&M University, Tallahassee, FL 32307. St. Marks River estuarine system consists of open-water habitat and salt marshes on the estuarine borders. The salt marsh is traversed by many tidal creeks which transport fish from the estuary into the marsh zone. Fifty-five species of fish use the estuarine system in different seasons of the year. The species composition, dominance seasonal and spatial patterns of fish in the estuarine system are discussed. Special emphasis is placed on the categories of species, namely residents, migratory species and occasional visitors, and their role in the ecology of the system.

Saturday, March 26, 1994, 8:45 am - 10:30 am, Tucker 207

SESSION E - Ecology I

Robert Mattson, Suwannee River Water Management District, Presiding

8:45 am, BIO-29E

Seasonal Abundance and Diel Biting Periodicity of Diachlorus ferrugatus (Diptera: Tabanidae) in North Florida. J.E. CILEK, John A. Mulrennan, Sr. Research Laboratory, Florida A&M University, Panama City, FL 32405. In North Florida, the tabanid Diachlorus ferrugatus was found to be most abundant from late May until the middle of June. The first appearance of this species occurred as early as March and continued until mid-August. During June, a single peak of daily biting activity for this

human pest was observed from 1600 h to 1900 h (CST). No host seeking activity of this species was observed during the hours of darkness.

9:00 am, BIO-30E Ethogram for Hunting Behavior in the Spider Wasp, Pepsis formosa (Hymenoptera: Pompilidae): Evidence for Behavioral Plasticity. F. PUNZO, Dept. of Biology, University of Tampa, Tampa, FL 33606. The effects of encounter experience on the hunting behavior of Pepsis formosa (Say) were analyzed. The time required to complete the hunting sequence decreased significantly with increasing number of encounters between the wasp and its tarantula host, Aphonopelma echina. The amount of time required to complete certain behavioral components of hunting, such as initial approach, antennation and the paralyzation sequence, decreased significantly as a function of increasing encounter experience. Previous experience had no effect on other behavioral components such as grooming, burial and oviposition, and closure of the burrow. Additional parameters of hunting behavior were also investigated including the direction of initial approach, location of stinger insertion on the host, and wound lapping.

9:15 am, BIO-31E Mate Choice Experiments with Mosquitofish, Part I. S. TAYLOR (1), E. BURT (2), G. HAMMOND (3), K. RELYEA (2), (1) Psychology Dept. Armstrong State College, (2) Biology Dept. Armstrong State College, Savannah, GA 31419. Mate Choice experiments based on visual stimuli were performed with mosquitofish, Gambusia holbrooki. Female mosquitofish, appropriately acclimated, were initially tested to determine if there were biases in the experimental aquaria. Females were then tested for preference for males of the same or different populations and preference for normally pigmented or melanistic males. Experimental apparatus and design, data, and results are discussed.

9:30 am, BIO-32E Mate Choice Experiments with Mosquitofish, Part II. S. TAYLOR (1), E. BURT (2), G. HAMMOND (2), K. RELYEA (2), (1) Psychology Dept. Armstrong State College, (2) Biology Dept. Armstrong State College, Savannah, GA 31419. Mate choice experiments based on visual stimuli were performed with mosquitofish, Gambusia holbrooki. Experimental design was discussed in Part I of this study. In this portion of the study, female preference for normally pigmented males or partially melanistic males, and population preferences were tested. In addition, preference for normal males or melanistic males by females acclimated with either normal or melanistic males was tested.

9:45 am, BIO-33E Catfish and Crayfish Distribution in Florida's Fully-Flooded Caves. W.J. STREEVER (1) AND J.A. HALE (2), (1) Department of Environmental Engineering, University of Florida, Gainesville, FL 32611, (2) Department of Fisheries and Aquatic Sciences, University of Florida, Gainesville, FL 32611. A general description of Florida's fully-flooded cave systems and the results of a study of distributions of troglobitic (obligate cave-dwelling) crayfish and troglophilic (facultative cave-dwelling) catfish in relation to cave openings will be presented. Animal abundances were measured

along 244 m transects in 16 caves. Each transect was divided at its center-point into two half-transects. Mean abundances of animals on the half-transects nearest to cave openings were compared to those on the half-transects furthest from cave openings. Catfish were significantly more abundant on the half-transects nearest cave openings (Wilcoxon paired rank sum test, $p < 0.05$), while significant difference was found for crayfish.

10:00 am, BIO-34E The Establishment of a Computerized Data Base of Avian Populations in Dry Tortugas National Park. SCOTT R. ECKERT, National Park Service, Dry Tortugas National Park, P.O. Box 6208, Key West, FL 33041. A dBASE compatible program was prepared describing the periodicity of multiple species of both migratory and endemic bird populations frequenting the Dry Tortugas. Data was acquired through personal observation and past records as well as experts visiting the Dry Tortugas on "birding" expeditions over a four year period. Data includes: common name, genus species, observation date, numbers, general location, field notes, GPS locator, and weather conditions.

10:15 am, BIO-35E Studies of Differential Ontogenetic Expression of Cholinesterase Biochemical Species and Molecular Forms in the Avian Inner Ear. J.E. LOVE AND G.M. COHEN, Department of Biological Sciences, Florida Institute of Technology, Melbourne, FL 32901. In birds, the organization of the basilar papilla (sensory epithelium) displays an architecture in which progressively more distal regions are selectively responsive to lower frequencies (place principle). However, although efferent neurotransmission in this system appears to be predominantly cholinergic, the contribution of efferent innervation to such functional differentiation remains unclear. We report on the analysis of cholinergic cytodifferentiation phenomenology by evaluation of the expression of cholinesterase biochemical species (types) and molecular forms in the chick's inner ear by means of biochemical methodologies.

10:30 am, BIO-36E Temperature and Salinity Tolerance of Selected Nonindigenous Fishes Established or Collected in the State of Florida. L.O. GOODKIN (1), T.L. CRISMAN (1), AND J.D. WILLIAMS (2), (1) University of Florida, ENE Dept., Black Hall, Gainesville, FL 32611, (2) Natural Fishery Research Center, 7920 NW 71st St., Gainesville, FL 32606. Acknowledgments: Research funded by U.S. Fish & Wildlife Service. Salinity and temperature tolerance interaction was tested for 10 species of nonindigenous fishes. The maximum LS-50 for these species were as follows: black tetra, Gymnocorymbus ternetzi, 15 ppt; brick-red swordtail, Xiphophorus helleri, 42.5 ppt; zebra danio, Brachydanio rerio, 15 ppt; Jack Dempsey, Cichlasoma octofasciatum, 40 ppt; Mayan cichlid, Cichlasoma urophthalmus, 80 ppt; Oscar, Astronotus ocellatus, 20 ppt; jewel cichlid, Hemichromis letourneauxi, 60 ppt; suckermouth catfish, Hypostomus sp., 15 ppt; silver dollar, Metynnis sp., 15 ppt; red platyfish, Xiphophorus sp., 27.5 ppt.

Saturday, March 26, 1994, 8:45 am - 10:30 am, Tucker 209

SESSION F - Ecology II

Paul Moler, Florida Game & Freshwater Fish Commission, Presiding

8:45 am, BIO-37F The Brevard County Habitat Conservation Plan: Its Role in Maintaining Herptile Diversity. S.H. HEFLICK, Florida Institute of Technology, Melbourne, FL 32901. Brevard County, FL is currently undertaking the task of developing a Habitat Conservation Plan (HCP) for the protection of scrub communities. This paper will review the habitat requirements of scrub associated herptiles and will discuss how the protection of these herptiles can be accommodated within a HCP. It will use scrub habitat data based on aerial photo interpretation, ground truthing, and GIS analysis in Brevard County to illustrate these principles.

9:00 am, BIO-38F Recognition Characters and Juxtaposition of the Florida and Mississippi Slimy Salamanders, Plethodon glutinosus complex. J. LAZELL, The Conservation Agency, 6 Swinburne Street, Jamestown, RI 02835. Plethodon of the glutinosus complex include the forms grobmani, largely from Florida, and mississippi, largely from Mississippi. They approach on the Alabama Gulf coast. Size, snout proportions, and several pattern elements facilitate separation of the two, previously distinguished biochemically. Remarkably, grobmani extends west of Mobile Bay at least to Mon Louis Island, Mobile County. The form mississippi occurs in Mobile and at points north and west. Nearly ubiquitous habitat destruction in Mobile County precluded determination of close parapatry, or sympatry, or intergradation. In contrast to mississippi, grobmani is rather short-faced, averages larger, and has modally more light lateral blotching, but less axillary and gular fold pigmentation.

9:15 am, BIO-39F The Effects of Brazilian Pepper (*Schinus terebinthifolius*) on Gopher Tortoises (*Gopherus polyphemus*) Habitat Utilization. J.R. HICKLIN, Florida Atlantic University, Department of Biological Sciences, Boca Raton, FL 33431. Three plots were chosen on the Florida Atlantic University (F.A.U.) Ecological Preserve to study the effect of Brazilian Pepper, and exotic tree, on the burrow site selection and foraging range of the native Gopher Tortoise. Distances to the nearest Pepper tree, the area of the tree and nearest neighbor distances were measured. The foraging range of eight or nine tortoises in each plot was evaluated using fluorescent dye tags. Proximity to tree, size of tree and nearest neighbor distance exhibited no effect on burrow site selection or foraging range. Funding provided by: The Gopher Tortoise Council, Chicago Herpetological Society, and the F.A.U., Department of Biological Sciences.

9:30 am, BIO-40F Spatial Distribution Patterns in the Gopher Tortoise, Gopherus polyphemus, at Lake Woodruff National Wildlife Refuge. J.A. BREUCHEL, L.A. LASHBROOK, AND M.J. VAN IDERSTINE, Biology Dept., Stetson University, DeLand, FL 32720. We surveyed tortoise burrow location in a central Florida population to determine if their distribution was influenced by recent burn history. As a basis of

comparison, Monte Carlo simulations were used to determine expected nearest neighbor distances assuming random distributions. At a large spatial scale (1200 m), tortoises were randomly dispersed, while at small scales (200 m), the tortoises were arranged either randomly or in a significantly uniform pattern. There was a significant correlation between the density of tortoises and the degree to which their spatial arrangement was uniform. Burrow location was not strongly influenced by recent burn history.

9:45 am, BIO-41F

The Effect of Light Level on the Frequency of Caudal Luring in a Rattlesnake, Sistrurus miliarius. A.M. RABATSKY, T.M. FARRELL, P.G. MAY, Biology Dept., Stetson University, DeLand, FL 32720. Caudal luring has been observed in many ambush foraging snakes but has not been experimentally investigated in the past. We studied the influence of light level on the frequency of caudal luring in juvenile dusky pigmy rattlesnakes. Pigmy rattlesnakes (n=20) were offered prey under four different light levels. Snakes lured in 20% of all trials. All captive-born snakes and 44% of field-born snakes lured under at least one level. Light level, however, had no statistically significant influence on the frequency of luring. We hypothesize that pigmy rattlesnakes lure in response to the presence of prey rather than the enhanced crypsis associated with low light levels.

10:00 am, BIO-42F

Annual Variation in Reproductive Parameters in a Central Florida Population of Rattlesnakes, Sistrurus miliarius. M.A. PILGRIM, T.M. FARRELL AND P.G. MAY, Biology Dept., Stetson University, DeLand, FL 32720. Previous research shows that most temperate snakes exhibit significant annual variation in key reproductive traits. We observed reproduction in 25 females in 1992 and 29 females in 1993. Gravid females were captured 1-4 weeks before giving birth and held in outdoor enclosures to allow us to determine several reproductive parameters. There were no significant between year differences in mean adult female size, date of parturition, mean litter size, or mean offspring size. There was, however, significant annual variation in the relationship between adult body size and litter size. Unlike temperate snakes, this subtropical species exhibited little annual variation in key life history traits.

10:15 am, BIO-43F

Sexual Dimorphism in the Rattlesnake Sistrurus miliarius barbouri. L.A. BISHOP, T.M. FARRELL, AND P.G. MAY, Biology Dept., Stetson University, DeLand, FL 32720. Most viperid snakes are sexually dimorphic in both body size and tail length. We measured weight, body and tail length, and head size and shape in 148 neonate rattlesnakes from 27 litters. Only tail length exhibited significant sexual dimorphism. Data from field-captured snakes indicates that adults also lack strong sexual dimorphism. Field observations indicate that large male snakes were observed either copulating or associating with females more often than small males. Large females produce larger litter sizes than small females. The lack of sexual dimorphism in pigmy rattlesnakes is apparently the result of selection for large body size that is of similar intensity in both sexes.

Saturday, March, 26, 1994, 8:45 am - 10:30 am, Tucker 205

SESSION G - Environmental Biology

Linda Mytinger-Tyson, University of Florida, Presiding

8:45 am, BIO-44G Little Lake Weir: A Paleolimnological Study of Progressive Eutrophication. H.C. KUNTZ AND T.L. CRISMAN, Environmental Engineering Sciences, University of Florida, Gainesville, FL 32611. The escalating problem of eutrophication of Florida lakes was examined through a paleolimnological examination of a sediment core from a small eutrophic lake in Marion County. Situated above the impermeable Hawthorne Formation and connected via a shallow marsh to Lake Weir, both the history of eutrophication of Little Lake Weir and its downstream impact on Lake Weir were revealed through core profiles of annual accumulation of phosphorus, nitrogen, inorganic sediment and chironomids. Historical deposition rates are discussed relative to watershed development and eutrophication patterns in the interconnected lake system.

9:00 am, BIO-45G A Rapid Quantitative Assay for Heavy Metal Toxicity in Aquatic Samples. K. JUNG, G. BITTON, AND B. KOOPMAN, Dept. Environmental Engineering, University of Florida, Gainesville, FL 32611. A rapid and quantitative enzymatic assay which is specific for heavy metal toxicity in aquatic samples has been developed. An ubiquitous enzyme urease has been used for this purpose. The urease assay has been miniaturized for microplate use and for the determination of IC₅₀ which gives 50% inhibition of enzyme activity by toxicants. The urease assay showed higher sensitivity to heavy metals (Cu, Zn, Cd, Hg, Ni, Cr, Pb) than Microtox and comparable sensitivity to Daphnid toxicity bioassay. The urease assay was not sensitive to some organic compounds (SDS, phenol, lindane, PCP, methanol) at concentrations much higher than those found in aquatic environment. The urease assay can be run as a screening test for toxicant characterization for heavy metals in phase 1 of Toxicity Reduction Evaluation proposed by the U.S. EPA.

9:15 am, BIO-46G Determination of Heavy Metal Binding Capacity (HMBC) in Natural and Waste Waters. F. HUANG, I-C. KONG, G. BITTON, AND B. KOOPMAN, Dept. of Environmental Engineering Sciences, University of Florida, Gainesville, FL 32611. Heavy metals exist in various chemical forms, which are directly related with the toxicity. Different receiving waters contain various range of HMBC. In this communication, we present a method to illustrate the range of HMBC of various natural waters in the presence of cadmium. The assay is based on enzyme inhibition in *E. Coli*. HMBC was obtained by ratio of EC₅₀ of sample over that of moderately hard water in the presence of metal. Our results illustrated different HMBC depending on the type of water samples. Samples, like sea water or estuary, showed high HMBC, for example, 27.1 and 19.0 for Tampa Bay and St. Johns River, respectively. Samples collected from primary effluent showed 6.5. In general, samples collected from lakes (Alachua County) showed low HMBC values ranging from 1 to 4.

9:30 am, BIO-47G

Resistance to Multiple Heavy Metals in *Xanthomonas maltophilia*. L.M. LATINWO, L. CHEN, AND C.O. IKEDIOBI, Department of Biology and Chemistry, Florida A&M University, Tallahassee, FL 32307. Heavy metals at lower concentrations are essential micro nutrients for living organisms. But their ability to nick DNA and denature protein in higher concentrations confer comprehensive toxic effects on cells. *X. maltophilia*, isolated from heavy metal contaminated soil in Oak Ridge, TN, display a strikingly unique property to promote transformations from toxic to non-toxic forms of a variety of toxic metal cations. The present study was conducted to examine the growth response of *X. maltophilia* to multiple heavy metals. Analysis of the growth pattern of *X. maltophilia* exposed to a mixture of sodium selenite and copper sulfate suggest that these two metals had no synergistic toxic effect on cell growth. However, sodium selenite combined with mercuric chloride exhibited an additive toxic effect. A similar result was observed in an experiment where potassium chromate and copper sulfate were added to the growth medium.

9:45 am, BIO-48G

Interactions of Low Levels of X-Ray Particles with Mammalian DNA. L.M. LATINWO (1), C.O. IKEDIOBI (1), AND N.P. SINGH (2), (1) Departments of Biology and Chemistry, Florida A&M University, Tallahassee, FL 32307, (2) Department of Psychiatry RP-10 Health Science Building, University of Washington, Seattle, Washington 98195. The effects of environmentally toxic agents and/or drugs in living organisms are manifested by carcinogenesis, aging and gene dysfunctions which are often tissue and cell-type specific. This study was undertaken to investigate DNA damage in rat kidney cells from exposure to low levels of X-rays (dose equivalent to those encountered daily during X-ray irradiation at 25 to 50 rads) and the extent of DNA damage in individual cells was quantitated using the alkaline cell micro gel electrophoresis assay. Our results show dose-dependent effects of X-rays (25 to 50 rads) on DNA damage in rat kidney cells. (Supported in part by ATSDR grant U50/atu398948-01).

10:00 am, BIO-49G

A New Microbial Test for the Specific Determination of Solids-Associated Heavy Metal Toxicity. E. GARLAND, I-C. KONG, G. BITTON, B. KOOPMAN, AND J.L. MOREL, Department of Environmental Engineering Sciences, University of Florida, Gainesville, FL 32611. A direct solid-phase toxicity test based on the activity of β -galactosidase in *E. coli* was developed to assess heavy metal toxicity in soils, sediments and sludges. This method consists of adding the test bacteria directly to the solids and assaying for heavy metal toxicity by measuring enzyme inhibition, in microplates, with a colorimetric assay. This rapid method allows for results within 2½ hours. Preliminary trials displayed toxicity in artificially contaminated sands and soils. Our test revealed that 4 out of 17 soil samples were toxic whereas 3 of 7 Florida sediments displayed heavy metal toxicity. Five of 6 wastewater sludge samples from France showed toxicity. The advantages of this assay over existing toxicity tests will be discussed.

10:15 am, BIO-50G Effects of Heavy Metals on Reductive Dechlorination of Chlorophenols (CPs) in CP-Adapted Sediment. I-C. KONG (1) AND W.J. JONES (2), (1) Dept. of Environmental Engineering Sciences, University of Florida, Gainesville, FL 32611, (2) U.S. EPA, Athens, GA 30603. Environments receiving the accidental release of hazardous and toxic substances are often contaminated not only with organic compounds but also with toxic metals. In this communication, dechlorination of CPs was investigated in the presence and absence of metals in anoxic sediment adapted to the respective CPs. No lag periods were observed prior to dechlorination for all CPs tested in the absence of metals. The preferential order of chlorine removal was *ortho* > *meta* > *para*. The differences in metal inhibition for the various CP-adapted sediment populations may be due to differences in the microbial populations catalyzing the dechlorination reaction.

COMPUTER SCIENCES

Friday, March 25, 1994, 2:00 pm - 3:15 pm, Tucker 213

J.R. Newman, Florida Institute of Technology, Presiding

2:00 pm, CMS-1 Recent Developments in Computer Science Education. J. RICHARD NEWMAN, Computer Science Program, Florida Institute of Technology, Melbourne, FL 32901. The field of Computer Science education continues to undergo major restructuring. As high school students become more computer literate, the expectations from college level computer courses from all majors continue to increase. As many college graduates have discovered, computer skills are essential in most professions. These pressures have forced dramatic changes on the computer-related course offering at the college level. To accommodate the breadth of needs, new curriculums have been developed and experimentation are underway with a variety of methodologies. This paper describes several of the major efforts and discusses many of the new approaches to teaching computing to all levels of undergraduates.

2:15 pm, CMS-2 A Multimedia Interface for a Marine Resources Council Database. DHARMA REDNAM AND J. RICHARD NEWMAN, Computer Science Program, Florida Institute of Technology, Melbourne, FL 32901. The Marine Resources Council has created a database containing a variety of information about the Indian River Lagoon. This project describes a multimedia interface that was created to enhance the ability of the general public to access this database in a useful and friendly manner. The multimedia components have been chosen to emphasize the unique characteristics of the database while making the user interface simple yet powerful.

2:30 pm, CMS-3 Optimal Periodic Testing for Stand-by Systems. A.B. VAFAIE AND FREDERICK B. BUONI, Operations Research Program, Florida Institute of Technology, Melbourne, FL 32901. This paper discusses the development of an optimal

testing program for stand-by systems that meets reliability goals with a specified Bayes assurance. The method is applied to persistent and transitory failure modes with exponential and Weibull reliability models.

2:45 pm, CMS-4 K-Means Clustering: A Pyramid Approach. WOOK-SUNG YOO, CHI-YEON PARK, Department of Computer Science, Florida Institute of Technology, Melbourne, FL 32901. A multi-resolution K-means clustering method is presented. Starting with a low resolution sample of the input data, this method applies K-means algorithm to a sequence of monotonically increasing-resolution samples of the given data. The cluster centers obtained from a low resolution stage are used as initial cluster centers for the next stage which is a higher resolution stage. The idea behind this method is that a good estimation of the initial location of the cluster centers can be obtained through K-means clustering of a sample of the input data, reduces the convergence time of the algorithm. The pyramid K-means algorithm is tested on several multi-spectral images and compared to traditional K-means. It is found that in the average case pyramid K-means reduces the computation time by a factor of four with a slight improvement in the quality of clustering.

3:00 pm

SECTION MEETING

J.R. Newman, Florida Institute of Technology, Presiding

ENVIRONMENTAL CHEMISTRY AND CHEMICAL SCIENCE

Friday, March 25, 1994, 2:00 pm - 4:45 pm, Tucker 105

Robert F. Benson, I.E.S., University of South Florida, Presiding

2:00 pm, ENV-1 Effect of Treated Black Liquor on *Hydrilla verticillata* (Royle). ANDREW L. HASSELL (1), BARBARA B. MARTIN (1), DEAN F. MARTIN (1), AND JESSE M. VAN DYKE (2), (1) Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620, (2) Bureau of Aquatic Plant Management, Florida Department of Environmental Protection, 3917 Commonwealth Blvd., Tallahassee, FL 32399. Kraft black liquor (KBL), a by-product of the paper pulp industry, was neutralized, treated and diluted to produce a material (10% neutralized KBL) that has the potential to retard the growth of *Hydrilla verticillata* (Royle) by shading. Phase one of the research is concerned with the mechanism of action: light reduction versus chemical toxicity. A Warburg bioassay indicated that addition of the dark liquid (10% neutralized KBL) inhibited oxygen production within an hour. A non-contact bioassay indicated the dark liquid significantly affected the light that hydrilla could receive. Both the percent fresh weight change of hydrilla and light intensity were directly related to the log of the black liquor concentration (dilution with 10% Hoaglands).

2:15 pm, ENV-2

Effects of Four Dyes on Rates of Oxygen Production by Lyngbya majuscula. E.D. GROSS AND D.F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. Lyngbya majuscula, a blue-green alga, grows profusely in nutrient-rich waters of the southern U.S. and is of environmental concern because current control methods are inadequate. Two studies were conducted with the alga in order to obtain data which could be of value in designing new control methods; 1) The effect of four dyes (rose bengal, methylene blue, zinc phthalocyanine-tetrasulphonate, and erythrosin) on the rate of oxygen production was measured. The dyes are known sensitizers for the production of singlet oxygen. 2) Cultures grown under various conditions were screened with the ternary complex chrome azurol S/iron (III)/hexadecyltrimethylammonium bromide in order to detect any iron chelating substance produced by the alga. The results of these studies will be discussed.

2:30 pm, ENV-3

An Environmental Study of Citrus Leaf Burn. ROBERT S. BRAMAN, DEAN F. MARTIN, M. STACY THOMSON, PAUL BAUER, MITCHELL KATZ, SUREN RODRIGUES, AND ANDREW HASSELL, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. Florida citrus trees exhibit a leaf burn generally in the Fall of the year. In this study an orange grove site in Hillsborough County, Florida was monitored for various possible pollutants which could cause leaf burn. Of particular interest were airborne nitrogen oxide type compounds such as nitrogen oxides, nitrites, nitrates, and nitrosamines. Sulfur oxide compounds in air were also monitored. Possible impact from airborne mercury fluorides, and other compounds were also studied. Nitrogen oxide type emissions from soil sources are also considered. Results of the study for the Fall of 1993 are presented.

2:45 pm, ENV-4

Effects of Microwave Irradiation (2450 MHZ CW) on Ptychodiscus brevis and Nannochloris oculata Interactions. REZA MAHRAM, DEAN F. MARTIN AND BARBARA B. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. Previous experiments by Martin (et al 1977) was found that after microwave irradiation (2450 MHZ CW) of P. brevis in culture together with Gomophosphaeria aponina resulted in lysis of P. brevis. However after irradiation of the title organisms, P. brevis appeared to cause the growth inhibition, and not Nannochloris oculata; a curious result, since under natural conditions, N. oculata inhibits P. brevis.

3:00 pm, ENV-5

Is Deposition All Wet? JON LEONARD AND R. DEL DELUMYEA, Millar Wilson Laboratory for Chemical Research, Jacksonville University, Jacksonville, FL 32211. During the period of 1991-1993 wet, dry, and total deposition samples were collected at a single site. Three different sampling devices were used for collection of deposition. Wet and dry deposition were collected by a single device and two total samples were collected on separate devices. In theory, the sum of the wet deposition and the dry deposition should approximately equal the total deposition. The relationship

between wet, dry, and total deposition will be tested using selected cations. Analysis will be done by atomic absorption on a Varian SpectrAA-250 Plus.

3:15 pm, ENV-6 Extraction of the Dolomite Impurity in Phosphate Rock. ROBERT F. BENSON AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. As the high grade deposits of phosphate rock in Florida are depleted, future sources of ore for Florida Producers will be derived from lower grade rock containing undesirable levels of magnesium. Magnesium causes problems in the production of phosphoric acid that increases the cost of production. Aqueous carbon dioxide is used for extraction of the magnesium and calcium from the carbonate component of the phosphate rock. Then the calcium and magnesium is extracted by transfer to another material which can be separated from the slurry. This treatment of the rock results in considerable improvement in ore quality.

3:30 pm, BREAK

3:45 pm, ENV-7 Decontamination of Phosphogypsum Stack Pond Water. L.J. WILSON, D.F. MARTIN AND R.F. BENSON, Institute of Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. Water that drains through the phosphogypsum stacks is known to contain some heavy metals and high concentrations of acids that are working their way into the aquifer. These pollutants have been shown to respond to simple treatment with basic minerals such as limestone. The improvement of pond water will be shown by following the levels of dissolved solids through several degrees of severity of treatment. This technique offers some promise in other waste water systems.

4:00 pm, ENV-8 Studies of Metal Extraction from Environmentally Significant Media Using Supported Chelating Agents. C.D. NORRIS, R.F. BENSON, AND D.F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL 33620. Many heavy metals are unwanted impurities in various industrial processes, and may also end up in the environment. We at the Institute are concerned with the recovery of heavy metals from environmentally significant media. One of the techniques being considered for this use is extraction with supported chelating agents. Several methods of securing a chelating agent to a solid support have been examined, including anchoring and anionic exchange. The ability of selected supported agents to extract metals from solution was determined. Samples of ammonia/ammonium chloride buffers of pH 9.00 were spiked with a known concentration of metal ion and were extracted with selected supported chelating agents. The metal-loaded agents were then stripped of the chelated metal with acid solution. Percentages of metal extracted and recovered were determined via analysis by atomic absorption spectroscopy. An effective chelating agent (8-hydroxy-quinolinesulfonic acid) was attached to a variety of supports, in order to determine the effect of the support itself on metal extraction with a supported

chelator. The results of these efforts are presented. The synthesis and potential of chelating agents containing a thiol (-SH) group will also be discussed.

4:15 pm, ENV-9

Synthesis of Supported and Unsupported Schiff Base Compounds for the Dehalogenation of Trichloromethane and the Uptake of Nickel. DUKE D. POORE', ROBERT F. BENSON, AND DEAN F. MARTIN, Institute for Environmental Studies, Department of Chemistry, University of South Florida, Tampa, FL #3620. The first aspect of the study involves the examination of supported vs. unsupported salicylaldehyde toward dehalogenation of chloroform in aqueous medium. A typical sample matrix consisted of 5.65 mmole salicylaldehyde (prepared by condensation reaction between salicylaldehyde and a primary amine), 22.0 mmole chloroform, and 200 mL DI water. The samples were screened for activity in terms of percent chlorine converted to chloride following a 48 h reflux period. The determination of Cl⁻ released was accomplished via potentiometric titration. The second phase of the project examines the ability of selected ligands to remove Ni²⁺ from solution via formation of an insoluble nickel chelate. Ligands (in hexane) were added to pre-treated silica gel, and a nickel solution was transferred to the composite. The mixture was agitated and filtered; subsequently, the filtrate was diluted 200-fold and was analyzed for Ni using atomic absorption methods.

4:30 pm**SECTION MEETING**

Robert F. Benson, I.E.S., University of South Florida, Presiding

FLORIDA COMMITTEE ON RARE AND ENDANGERED PLANTS AND ANIMALS

Friday, March 25, 1994, 2:00 pm - 4:15 pm, Tucker 205

Paul Moler, Florida Game and Fresh Water Commission, Presiding

2:00 pm, REB-1

Habitat Quality Assessment of Brevard County Scrub. SHANNON BOYLE, Dept. of Biological Sciences, Florida Institute of Technology, Melbourne, FL 32901. A variety of endangered and threatened species are associated with scrub habitats. Over the past few decades there has been a rapid loss, degradation and fragmentation of this crucial habitat due to encroaching urban and agricultural development. The aim of this paper is to describe the rapid assessment of the quality of scrub habitats for listed species as part of the design of a Scrub Jay Habitat Conservation Plan for Brevard County. This assessment includes a rapid appraisal of the status of particular scrub fragments that have potential to support listed species. Because there is significant diversity among types of scrub vegetation, assessment of sites includes descriptions of each scrub community within a site, the connectivity of the fragment and its need for restoration. A quantitative assessment of habitat quality will be based on field

surveys, color IR and aerial photo interpretation, and GIS analysis. Scrub habitats will be reviewed in the context of adjacent natural communities to provide an ecosystem approach to scrub conservation.

2:15 pm, REB-2

The Cedar Point Study: Comparison of Survey Methods for Listed Species. J.W. BEEVER III, Florida Game and Fresh Water Fish Commission (FGFWFC), Punta Gorda, FL 33955. The Cedar Point site is an 88 acre creek-flanked peninsula located on the mainland side of the Lemon Bay Aquatic Preserve. The Lemon Bay Conservancy commissioned a vegetation and wildlife inventory of the site. Fourteen ecological "communities" exist within and immediately adjacent to the site boundaries. Twenty-eight listed plant species and twenty-seven listed animal species were found on the site in a 13 month period. The accuracy, efficacy, and cost-benefit of windshield, random walk, FGFWFC 18.D Wildlife Methodology Guidelines, belt transects, diminishing quarters, and directed site surveys to locate listed species presence on this site were compared and contrasted. Directed site surveys are most accurate for mobile animals. Season of survey is critical for most species. Diminishing quarters is most accurate for stationary animal artifacts and plants. Cost-benefits vary depending if cost is measured monetarily or by species missed.

2:30 pm, REB-3

The Effect of Disturbance on Growth, Flowering, and Fruiting in the Endangered Pawpaw, Deeringothamnus rugelii. J.H. HELKOWSKI AND E.M. NORMAN, Department of Biology, Stetson University, DeLand, FL 32720. To determine if disturbance affected the productivity of Deeringothamnus rugelii, twelve experimental blocks were selected in a cow pasture near New Smyrna Beach where this species is abundant. Each block consisted of three neighboring plants. One plant was subjected to fire, another to clearing by clipping all above ground growth, and the third plant was an unmanipulated control. We monitored vegetative growth, floral, and fruit production for four months. Disturbance significantly enhanced vegetative and floral output. In both the clipped and burned treatments, two fruits were produced while none developed in the controls. Research supported by a grant from U.S. Fish and Wildlife Service.

2:45 pm, REB-4

Effects of Site Preparation Activities on Rare Plants and Ground Cover Vegetation in the Appalachian National Forest. J. GLITZENSTEIN, D. STRENG AND S. HERMANN, Tall Timbers Res. St., Rt. 1 Box 678, Tallahassee, FL 32312. Longleaf pine-wiregrass communities, containing many rare species, are often impacted by forestry operations including site prep for planting pines. We monitored changes in vegetation composition and rare plant populations after mechanical (single or double chop) and herbicide activities. Results include: 1) grasses and shrubs decreased in mechanical treatments, 2) for all treatments, Baptisia simplicifolia, an endemic legume, declined then recovered after two years, 3) Hedeoma graveolans, a rare mint, increased but had altered population structure in both mechanical treatments, and 4) ruderals increased following mechanical treatments.

3:00 pm, REB-5

Recent Trends in Nesting of the Florida Green Turtle. STEVE A. JOHNSON, University of Central Florida, Dept. of Biology, Orlando, FL 32816. Historical levels of nesting by Chelonia mydas in Florida remain unknown. Although some authorities have speculated that the Florida population is a remnant of a much greater nesting assemblage, others have disagreed. Nest totals fluctuate biennially with relatively "high" seasons usually followed by "low" ones. The 1993 nesting season was a "low" year with only 87 nests recorded along the Brevard County portion of the Archie Carr National Wildlife Refuge. This was expected however, following an unsurpassed "high" of 686 nests recorded in 1992. Data gathered at the Carr Refuge during the past 12 years indicate a possible recent increase in population size. Analysis of clutch frequency and remigration interval data as well as statewide nesting totals suggest that approximately 850 reproductively active females comprise the Florida population.

3:15 pm, REB-6

Status and Trends in Upland Xeric Communities of Southwest Florida. J.W. BEEVER III, Florida Game and Fresh Water Fish Commission (FGFWFC), Punta Gorda, FL 33955. The xeric oak scrub, scrubby (xeric) pine flatwoods, and coastal strand plant communities of the southwest Florida region represent a distinct natural resource, especially in providing habitat to endangered, threatened, and of special concern plants and animal species. However, this resource base is deteriorating, and the most recent estimate (1986 LANDSAT) of the current inventory of these communities is 69,546 to 83,443 acres, or 10% to 15% of the region's historical extent of xeric native habitat. Region-wide, the historical loss based upon the soil type analysis approaches 99% for xeric oak scrub, 96% for coastal strand, and 91% for xeric pine flatwoods communities. The current status and future trends for xeric community listed species, including Florida scrub jay, gopher tortoise and commensals, southeastern American kestrel, shorebirds, sea turtles, and beach mice, are discussed.

3:30 pm, REB-7

The Effects of Reintroduction on Reproduction of Gopher Tortoises (Gopherus polyphemus) in West-Central Florida. C.R. SMALL, L.A. MACDONALD, AND L. HOFFMAN, University of Central Florida, Dept. of Biology, Orlando, FL 32816. Four gopher tortoise relocations are examined for effects to size and mass of clutches and eggs, and egg viability. Mean clutch size was 9.71 (range 2-13) for tortoises relocated to phosphate-mined lands and was significantly larger ($p < .01$) than for those relocated to a pasture site (5.71). Mean clutch size was 12.6 (range 5-22) for resident tortoises on a phosphate-mined site. The small gravid female tortoise was 187 mm carapace length and was from a remnant population in a sandhill habitat. Further analyses of reproductive data are discussed.

3:45 pm, REB-8

Gopher Tortoise (Gopherus polyphemus) Populations in the Wekiva Basin. R. MULHOLLAND (1) AND P.E. SMALL (2), (1) Florida Department of Environmental Protection, Division of Recreation and Parks, District 3 Administration, 1800 Wekiwa Circle, Apopka, FL 32712, (2) Florida Department of Environmental Protection, Wekiva Basin GEOPark, 1800 Wekiwa Circle, Apopka, FL 32712. Sandhill

communities in the Wekiva Basin were surveyed to determine gopher tortoise population densities. Burrow surveys were conducted following lightning-season burns. Burrow widths and activity status were recorded and used to calculate densities. The density estimates were then used as indicators of trends in gopher tortoise population levels and as a measure of the success of such resource management activities as prescribed fire and community restoration.

4:00 pm

SECTION MEETING

Paul Moler, Florida Game and Fresh Water Fish Commission, Presiding

GEOLOGY AND HYDROLOGY

Friday, March 25, 1994, 8:00 am - 10:00 am, Tucker 107

SESSION A

T.M. Scott, Florida Geological Survey, Presiding

8:00 am, GHY-1A The Random Ground Water Quality Monitoring Program, Collier County. G.G. GIBSON, Pollution Control Department, Collier County Government, Naples, FL 33962. Since 1986, 206 individual water wells have been sampled in the western half of Collier County through the County's Random Ground Water Quality Monitoring Program, in an effort to identify background properties, seasonal variability, and potential contaminant sources in the unconfined Surficial Aquifer System. In order to check for internal consistency in the data, each monthly sampling event involved three wells located within a one square mile area and completed in the same part of the aquifer system. Water quality analyses were performed for selected metallic, environmental, and biologic parameters. Assessment of the data has provided the County with a local framework of water quality information from which to make decisions.

8:15 am, GHY-2A The Trend Ground Water Quality Monitoring Program, Collier County. G.G. GIBSON, Pollution Control Department, Collier County Government, Naples, FL 33962. The Trend Ground Water Quality Monitoring Network consists of six sampling stations. Each sampling station consists of a shallow (water table aquifer) and a deeper (Lower Tamiami Aquifer) monitoring well. These wells are monitored on a quarterly schedule. The program parameter list consists of 43 metallic, environmental, and biologic parameters. The program SOP follows FDEP and USGS protocols. Unfiltered samples are analyzed, by a contract laboratory. Assessment of these analyses demonstrates the areal as well as seasonal variations of the 43 parameters, provides check points against which to compare the Random Program, and FDEP data which extends the coverage for all agencies.

8:30 am, GHY-3A Federally Reserved Mineral Lands in Florida. S.M. SPENCER, Florida Geological Survey, Tallahassee, FL 32304. Approximately 270,000 acres of land in Florida contain federally reserved minerals. Except for a few mineral resource maps prepared by the Florida Geological Survey (FGS) and surveys published by the United States Geological Survey (USGS Miscellaneous Field Series), there has not been many reports published on these lands. This report, which is based on FGS data, defines the geographic limits of the federally reserved mineral lands in Florida and correlates these lands with the various associated industrial minerals found here. The concept of public domain lands and the associated basic mineral types, as well as the current status of the Mining Law of 1872 are discussed.

8:45 am, GHY-4A A Geological Perspective for the Occurrence of Mercury in Florida. P.A. BOND, Florida Geological Survey, Tallahassee, FL 32304. The occurrence of mercury in the context of Florida's geologic and tectonic setting is poorly understood since significant mercury deposits are known to have very different associations. Available data (albeit sketchy) suggests that some mercury was incorporated into Florida's geologic materials, naturally, when they were formed (a background component), while additional studies document the accumulation of mercury in surficial earth materials as a result of anthropogenic activities. The relationship of mercury to organic deposits in Florida is inferred to be both particularly significant and complex since those deposits may concentrate mercury from a variety of natural and anthropogenic sources and possibly release it via poorly defined leaching and oxidation processes. Geological studies of mercury in fresh water and estuarine systems yield variable results. An attempt to infer the geology of mercury's origin, transport, distribution and redistribution in the Florida environment from published literature indicates numerous areas for further research.

9:00 am, GHY-5A Results of a Hydrogeologic Investigation at a Coastal Monitor Wellsite, Sarasota County, FL. D. DEWITT, Southwest Florida Water Management District, Brooksville, FL 34690. Test core drilling and ground water sampling was conducted at a coastal monitoring site in Sarasota County, Florida. A hydrogeologic profile was developed through core analysis and correlation of water level and water quality data. Three artesian aquifers were delineated and the position of the fresh/saltwater interface was identified in the test well. Results from test core drilling were used to design a well construction plan for aquifer pumping tests and continuous ground water monitoring. Aquifer pumping tests were conducted in the three artesian aquifers, and a total of five permanent wells have been constructed for ground water monitoring at the wellsite.

9:15 am, GHY-6A Lithostratigraphy and General Aquifer-System Characteristics of Southwest Florida: A Cooperative Study. J.D. ARTHUR (1), R. GREEN (1) AND D. DEWITT (2), (1) Florida Geological Survey, Tallahassee, FL 32304, (2) Southwest Florida Water Management District (SWFWMD), Brooksville, FL 34608. A three year cooperative program exists between the SWFWMD and the Florida Geological Survey

(FGS) to construct geologic cross sections throughout the SWFWMD region. The purpose of the program is to delineate the extent of regional lithostratigraphic and hydrostratigraphic units to aid in the management and protection of ground-water resources. Regional lithostratigraphy of Eocene through Miocene formations, gamma-ray log characteristics and aquifer system delineation are the primary focus of the cross sections. The SWFWMD Regional Observation and Monitoring Program (ROMP) has provided most of the data, however, FGS and U.S. Geological Survey data have been utilized as well. Interim reports and a final report are to be published by the FGS.

9:30 am, GHY-7A Fe-P Cycling as a Principle Diagenetic Mechanism in the Evolution of West Florida Shelf Phosphorite. K.B. FOUNTAIN AND G.H. MCCLELLAN, Department of Geology, University of Florida, Gainesville, FL 32611. Evidence supports the hypothesis that redox Fe-P cycling may be the principle diagenetic mechanism in the evolution of phosphorite nodules. Sediment mixing during sea-level highstands and reduced current velocities on the WFS permit the release of absorbed PO_4^{3-} in shallow anoxic sediments as a consequence of iron reduction. In the anoxic interval, non-ferruginous nodules are associated with the contemporaneous precipitation of carbonate fluorapatite (CFA) and glauconite. During sea-level lowstands, repositioning of the Gulf of Mexico Loop Current increases current velocities, producing oxic sediment conditions and ceasing Fe-P cycling. As a result, iron enrichment progresses at the expense of glauconite, calcium carbonate, and CFA.

9:45 am, GHY-8A The Benefits of Cave Diver Assisted Water Sampling at Wakulla Springs, Florida. L.R. WHITECROSS, Florida State University, Department of Geology, Tallahassee, FL 32306. Cave divers and hydrologists share a mutual interest in the Florida Aquifer and its contribution to Wakulla Springs. Due to this shared interest, a group of divers (part of the Woodville Karst Plain Project), are obtaining water samples during their exploration dives of Wakulla Springs. At specific locations, namely tunnels and unknown conduits, the sampling tubes are closed off at both ends thus trapping and isolating the water sample. The water samples are brought to the surface and then analyzed for the water's uranium isotopic signature. Using the water's unique uranium isotopic signature, the water is traced along the tunnels and the relative contributions of the tunnels can be established. Analysis to date have shown that tunnels A, B, and C contribute the largest portion of water to the spring. The divers used this information to continue mapping those tunnels, in particular tunnel A. Current samples will be used to continue directing the diver's exploration as well as delineate water flow patterns in the Floridan Aquifer in the surrounding area.

Friday, March 25, 1994, 2:00 pm - 4:15 pm, Tucker 107

SESSION B

T.M. Scott, Florida Geological Survey, Presiding

2:00 pm, GHY-9B

A Solution of the Solute Transport Ground-Water Flow Problem Using Time Series Analysis. RICK COPELAND, Department of Geology, Florida State University, Tallahassee, FL 32306. Most analytical solutions to the advection-dispersion (A-D) equation assume that hydraulic conductivity is homogeneous and steady flow conditions exist. Solutions are available for only a restricted set of conditions. A solution to the A-D equation using a linear transfer function in the time domain can be used to minimize these constraints. Columnar experiments and field tracer tests being conducted to test if the proposed equation meets mathematical assumptions and how well it performs relative to other solutions. Preliminary data indicates that the solution can be used to adequately simulate solute transport and minimize the effects of heterogeneity and irregular input.

2:15 pm, GHY-10B

The Variability of the Hydrogeologic Regime within the San Felasco Hammock State Preserve. KRISTOPHER SAUM, Geology Department, University of Florida, Gainesville, FL 32611. Within the San Felasco Hammock State Preserve a diversity of hydrogeologic regimes exists primarily due to a multiple aquifer scenario. A combination of surficial erosion and multiple stages of karstification of the carbonate strata within the Hawthorn Group and the Ocala Limestone has further complicated the hydrogeologic setting by connecting two or more of the aquifer systems. Features of hydrogeologic influence include multiple sinkholes. Characterization of the hydrogeologic scenario involved the correlation of test borings, ground penetrating radar transects, measurement of the density and trend of karst features, and generated surface water and groundwater data.

2:30 pm, GHY-11B

Lithofacies of the Upper Pleistocene Anastasia Formation of Florida. R.A. JOHNSON, Independent Geologist, P.O. Box 3560, Tallahassee, FL 32315. The Anastasia Formation occurs along the Atlantic Coast of Florida from east-central St. Johns County to southeastern Broward County. The defining lithologic component of the Anastasia is worn and abraded mollusk fragments, the presence of which indicates a high-wave-energy shallow-water-marine beach or near-shore bar environment of deposition. The Anastasia consists of two facies, carbonate and siliciclastic, which are divisible into four lithologies: quartz-sandy shell beds and quartz-sandy molluscan calcarenitic or calciruditic limestone; shelly quartz sand and shelly quartz sandstone. The cement in the consolidated limestone and sandstone consists of sparry to cryptocrystalline-translucent calcite.

2:45 pm, GHY-12B

The Geology of Warm Mineral Springs, Sarasota County. F.R. RUPERT, Florida Geological Survey, Tallahassee, FL 32304. Warm Mineral Springs is a 70m deep water-filled sinkhole in southern Sarasota County, Florida. Mineral-rich anaerobic water enters the sink through a spring vent near the bottom of the north wall of the sink. In 1991, divers explored and mapped the primary conduit feeding the spring to its terminus, a distance of 53 meters from the vent. Twenty-one geological samples, collected at 3 meter depth intervals from the north wall of the sink during the exploration,

are described. A geologic section for the sinkhole and a map of the primary cave are illustrated.

3:00 pm, GHY-13B Geology of the Solitario, Brewster and Presidio Counties, Texas. G.G. GIBSON, Pollution Control Department, Collier County Government, Naples, FL 33962. The Solitario is a breached structural dome about six miles in diameter, situated on the northern margin of the Chihuahua tectonic trend. The stratigraphic sequence of the interior portion of the structure is composed of intensely deformed middle Cambrian to Late Pennsylvanian siliclastic and carbonate sedimentary units, which represent the southwesternmost exposure of the Appalachian Orogen in the United States. The upturned flanks of this dome are thin transgressive quartzose interval. Tertiary rhyolitic plugs intrude the Paleozoic section. A rhyolite "rim sill" was intruded along the angular unconformity between the Paleozoic and Mesozoic units.

3:15 pm, GHY-14B The Okeechobee Formation: A Preliminary Reassessment of the Latest Pliocene to Late Pleistocene Lithostratigraphy of Southern Florida. T.M. SCOTT, Florida Geological Survey, Tallahassee, FL 32304. The Okeechobee formation, introduced by Scott (1992) as an informal unit, encompasses the sediments formerly assigned to the Caloosahatchee, Bermont and Fort Thompson formations in southern Florida. The Okeechobee formation is equivalent to an expanded Nashua Formation in northern Florida. The units included in the Okeechobee were defined by biostratigraphic means not lithostratigraphic ones. The establishment of the Okeechobee formation is an attempt to provide a lithologic framework for the biozonations of the latest Pliocene through late Pleistocene sediments of southern Florida.

3:30 pm, GHY-15B The Interplay of River Throughflow and Artesian Groundwater Input on the Waters of Lake Monroe, Florida. W.H. BULMER, Department of Geology, University of Florida, Gainesville, FL 32611. Lake Monroe is a large shallow lake on the St. Johns River within the St. Johns Offset. In addition to river water, Lake Monroe derives input from the Surficial, Intermediate and Floridan Aquifers. The physical and chemical characteristics of the lake vary as the hydrologic inputs fluctuate. This paper utilizes surface and sub-surface data available through the St. Johns River Water Management District to interpret conditions within the lake.

3:45 pm, GHY-16B The Use of Wetlands as a Tertiary Wastewater Treatment Alternative. VIRGINIA MIRABAL, Department of Geology, University of Florida, Gainesville, FL 32611. When managed properly, wetlands are proving to be an effective tertiary wastewater treatment system. Studies have shown that wetlands provide the same biogeochemical and physical processes which take place in conventional concrete and steel wastewater treatment plants. Compared to conventional treatment plants, wetlands offer a more cost-effective and energy efficient alternative. Wetlands are strongly buffered against the stress of treated wastewater additions, and they serve as effective sinks for nutrients, sediments and suspended matter, trace contaminants, and organic matter. When

considered within the context, the concept of wastewater to wetlands is a viable and effective alternative to the tertiary treatment and renovation of wastewater.

4:00 pm

SECTION MEETING

Donald W. Lovejoy, Palm Beach Atlantic College, Presiding

MEDICAL SCIENCES

Friday, March 25, 1994, 1:45 pm - 4:00 pm, Tucker 104

Roseann White, University of Central Florida, Presiding

1:45 pm, MED-1

Isolation and Classification of Airborne Molds and their Medical Significance. P. CRUZ, M.J. SWEENEY, R.S. WHITE, AND R.N. GENNARO, Department of Molecular Biology and Microbiology, University of Central Florida, Orlando, FL 32816. Air samples were taken in different buildings in order to assess for the presence and concentration of molds in the environment. The study involved the indoor and outdoor environments of selected buildings at the University of Central Florida, East Orlando Campus. Isolation of molds was achieved by using a Mattson-Garvin (slit-to-agar) air sampler and an Andersen sampler (N-6). Classification of molds was achieved by macroscopic and microscopic observations of the isolated colonies, through the preparation of Scotch-tape imprints, cover-slip cultures and slide cultures. Those molds isolated most often, and in the highest concentrations were: *Penicillium sp.*, *Cladosporium sp.*, *Curvularia sp.*, and *Drechslera sp.* By means of a questionnaire, we will identify those occupants of the sampling space who appear to have hypersensitive reactions to unknown sources in the indoor environment. We will determine if a correlation exists between the types and concentrations of molds and the presence of hypersensitive reactions in those individuals occupying the sampling space.

2:00 pm, MED-2

Isolation and Purification of the Major Allergenic Components from Plant Pollens. N. RODRIGUEZ, R. WHITE, R.N. GENNARO, M.J. SWEENEY, S.D. KLOTZ, Department of Molecular Biology and Microbiology, University of Central Florida, Orlando, FL 32816. SDS-PAGE analysis of defatted pollen extracts of *Paspalum notatum* (BA), *Callistemon citrinis* (BO), and *Melaleuca leucadendron* (ME) were analyzed. The grass pollen extract of BA contained more than 30 components. SDS-PAGE analysis of the pollen extracts of ME and BO produced 20 bands, each with similar banding patterns. The majority of proteins of all three extracts had a molecular weight above 24kD. Rotofot IEF fractionation demonstrated that all of the protein components in BO and ME are acidic and that the BA protein components appeared to be amphipathic. IgE binding components were demonstrated in all three pollen extracts using western blotting techniques, corroborating all previous works.

2:15 pm, MED-3 Role of Iron in Host-Parasite Interaction During Chronic Infections. M.A. IBANEZ (1), A.M. DHOPLE (1) AND T.C. POIRIER (2), (1) Florida Institute of Technology, Melbourne, FL 32901, AND (2) Holmes Regional Medical Center, Melbourne, FL 32901. For efficient metabolism and growth of plants, protists, and animals, appropriate qualitative and quantitative balances of essential metallic ions are required. It is becoming increasingly evident that the ability of a microbe to compete successfully with the host for iron is an important factor in the establishment of many bacterial infections. In order to evaluate the role of iron, supplemented with animal fat, on the fate of bacteria causing chronic infections, M. avium infection in mice was studied. Mice were infected Iv with M. avium, at periodic intervals, mice were sacrificed and various determinations were carried out. Data will be presented to demonstrate that iron enhances the infection process and bacterial growth. Furthermore, supplementing iron with beef fat further hastens the infection rate, as well as the bacterial mass during systemic infection. The extent of infection is directly related to percent saturation of iron in serum. Similar effects of iron are also observed on the in vitro growth of M. avium and M. tuberculosis.

2:30 pm, MED-4 Radiometric Studies and Drug Susceptibility Testing on M. avium. M.A. IBANEZ AND ARVIND M. DHOPLE, Florida Institute of Technology, Melbourne, FL 32901. Current methods for screening potential drugs against M. avium are either time-consuming or involve expensive instrumentation and reagents. There is an urgent need for a rapid and inexpensive method for screening newer drugs against M. avium. We are currently working on a study consisting of three parts: evaluation of the incorporation of several ^{14}C - and ^3H -tagged substrates by M. avium; study of the effects of two known antimycobacterial drugs, amikacin and firampicin, on the uptake of the selected radiolabeled substrates, and determination of the drug susceptibility of various M. avium human isolates using the selected radiolabeled substrates. The results will be presented at the meeting.

2:45 pm, BREAK

3:00 pm, MED-5 A Vanadate Hematoxylin Stain for Basic Proteins. A.A. SMITH, Barry University, Miami Shores, FL 33161. Ammonium meta-vanadate reacts with hematoxylin to produce a stain that is selective for the basic proteins associated with nucleic acids. Staining of histone and ribosomal protein is only slightly improved by removal of the nucleic acids by trichloroacetic acid or enzymes. Staining with vanadate hematoxylin after blocking the guanido group of arginine with benzil gives only a faint background stain. This background staining can be prevented by removal of the free amino group of lysine by diazotization.

3:15 pm, MED-6 Ryanodine and Verapamil: Depletion of Muscle Energy Stores. N. ALONSO, D. ALARCON AND E.T. HAYS, Barry University, Miami, FL 33161. High ryanodine and high verapamil, as well as subcontracture levels of theophylline

(2mM) cause significant depletion of energy stores in frog skeletal muscle (Hays and Connett, 1978; Sanchez and Hays, 1992; Hays et al, 1994). High verapamil (1mM), usually a Ca^{2+} channel antagonist, causes contractures in frog skeletal muscle (Bondi, 1978). In the presence of 100uM ryanodine, 2mM theophylline further depletes energy stores (Hays 35 al, 1994). Thus the purpose of our work was to determine if 1mM verapamil and 100uM ryanodine had additive effects on energy depletion. Our results indicate no significant additive effect of 1mM verapamil on ryanodine-induced depletion. These results suggest differences in the mechanism of interaction between verapamil and ryanodine as opposed to ryanodine and theophylline. (Supported by NIH MBRS grant, Barry University).

3:30 pm, MED-7

Therapeutic Versus Research Uses of Diltiazem, a Calcium Antagonist. D. WARD AND E.T. HAYS, Barry University, Miami, FL 33161. Diltiazem (cardiazem) is used therapeutically in the treatment of diseases such as hypertension, angina, and ventricular arrhythmias. Its usefulness in these diseases is based upon its ability to block L-type calcium channels in vascular and cardiac muscle. Although diltiazem's therapeutic effects on skeletal muscle are relatively insignificant, diltiazem does affect calcium fluxes in skeletal muscle. In our research we have ascertained whether diltiazem (50 and 500 uM) affects theophylline depletion of energy stores, a consequence of alterations in calcium balance in amphibian skeletal muscles. Our results show little or no effects on energy depletion suggesting theophylline depletion of energy stores occurs independent of blockage of L-type calcium channels in this preparation. (Supported in part by MIGMS-MBRS grant, Barry University).

3:45 pm

SECTION MEETING

A.M. Dhople, Florida Institute of Technology, Presiding

PHYSICAL AND SPACE SCIENCE

Friday, March 25, 1994, 2:00 pm - 4:30 pm, Tucker 106

Joan Schwebel, Maynard Evans High School, Orlando, Presiding

2:00 pm, PSS-1

An Evaluation of Charge Transfer Cross Sections via the Second Order Born Approximation. J. RYANS, P.R. SIMONY, Department of Physics, Jacksonville University, Jacksonville, FL 32211. Charge transfer is an inherently three body problem as it involves the transfer of one mass from the target to the projectile during a collision. Previous work has identified regions in "mass space" that are classically forbidden by conservation of energy and momentum. Quantum mechanical 2nd order Born approximations have been used to evaluate the charge transfer cross section for masses that span the classically allowed/forbidden region. The adequacy of such second order calculations will be discussed along with suggestions for estimating third order

terms. (Funded in part by the Ronald E. McNair Post-Baccalaureate Achievement Program).

2:15 pm, PSS-2 Monte Carlo Simulations in Hydrogen-argon Mixtures. M.E. TORELLI (1), W.J. WELTON (2), G.A. SALGUEIRO (2), AND T.M. HAKIM (3), (1) Dept. of Physics, Florida State University, Tallahassee, FL 32306, (2) Dept. of Physics, University of Miami, Coral Gables, FL 33124, (3) Physics and Engineering, Jacksonville University, Jacksonville, FL 32211. Hydrogen impurities in an argon matrix offer an interesting dynamic system to study as a test of the limits of the self-consistent phonon method and of the mixture's quantum mechanical nature. Monte Carlo techniques are used to set up the static configuration of the mixture in preparation for the dynamic analysis. The computational difficulty that such a system presents will be discussed along with some results of simulations on 1D, 2D and 3D mixtures. (Work is supported by a Research Corporation grant, C-3339).

2:30 pm, PSS-3 Deep Search Supernova Project: The Use of Microsoft EXCEL to Determine the Efficacy of Cross-telescope Image Comparisons. JOAN OSTROW SCHWEBEL, Maynard Evans High School, 4949 Silver Star Road, Orlando, FL 32808. This research was conducted as part of the Deep Search Supernova Project of the Department of Astrophysics at Lawrence Berkeley Laboratory and was sponsored by the U.S. Department of Energy as part of the TRAC program. Data from telescopes at LaPalma in the Canary Islands (LAP) and Kitt Peak National observatory near Tucson, Arizona (KPNO) was combined with galaxy and star data from the literature and prepared using a Microsoft Excel spreadsheet. The number of photons produced was determined. This information will eventually be used in the identification of new supernovae.

2:45 pm, PSS-4 Computer-Interfaced Mechanics Demonstrator. ARTHUR LITKA, LARRY BIGELOW, Seminole Community College, Sanford, FL 32773. This paper will discuss a "Mechanics Demonstrator" that employs some of the new Micro-Computer-Based-Laboratory technology. This demonstrator is intended to be used by the instructor in a lecture format to provide vivid demonstrations of mechanics principles that are difficult to perform with traditional equipment. The Micro-Computer-Based-Laboratory technology makes use of MacIntosh computers with Vernier Software, and various transducers hooked up to the computer, i.e., force probes and motion detectors. Some of the difficult concepts that can be dramatically addressed are the differences between velocity and acceleration, and Newton's Three Laws of Motion.

3:00 pm, PSS-5 Physics and Calculus: Til Death Do Us Part. T.M. HAKIM (1) AND C.E. LINDSEY (2), (1) Physics and Engineering, (2) Dept. of Mathematics, Jacksonville University, Jacksonville, FL 32211. Reforming the introductory physics course is the latest vogue within the physics community, and perhaps appropriately so, but little effort has been invested toward strengthening rather than revamping the existing

curriculum and teaching methodology. A new approach based on the old curriculum is adopted at Jacksonville University, supported by NSF-ILI 9252197. The introductory physics and introductory calculus are taught jointly, both instructors present at all times, with the computer at the center. The method is discovery-based and process-oriented, and students work in teams, no more than 2 per station. While the content is similar to that of the traditional track, the order of material is changed, the information is limited to a bare minimum (less is more philosophy), calculus techniques are integrated with the physics, *Derive* and *Lotus* are the tools of exploration, and emphasis is placed on problem solving. Teaching samples and analysis from this experiment will be presented.

3:15 pm, BREAK

3:30 pm, PSS-6 Experiences at the Third U.S./Japan/China Conference on Physics Teaching. ALEXANDER K. DICKISON (1), BETTY PREECE (2), (1) Seminole Community College, 100 Weldon Blvd., Sanford, FL 32773, (2) P.O. Box 033012, Indialantic, FL 32903. During the Summer of 1993, the Third U.S./Japan/China Conference on Physics Teaching was held in China. Physics instructors at both the high school and college levels attended. This week-long meeting included both formal and informal interchanges on various aspects of physics teaching. This paper will report on many of the highlights of this conference.

3:45 pm, PSS-7 Nucleolar Organizer Region Activity Patterns in Gravity Sensor Organs Exposed to Microgravity. J.E. LOVE AND G.M. COHEN, Department of Biological Sciences, Florida Institute of Technology, Melbourne, FL 32901. Spacelab-J experiments were conducted with the objective of examining the effect of microgravity on the development and differentiation of various avian tissues. Our studies employed several methods to evaluate the ontogenesis of statoconia and sensory epithelia (maculae) in the otolith organs of inner ear specimens. We report on the development of an improved histochemical approach to assess chronological and topographical aspects of nucleolar organizer region activity, and its application to the study of Spacelab-J embryonic chick maculae.

4:00 pm, PSS-8 Musical Highways: Tunes from the Road. R.W. LOWRIE, Dade Design and Construction, Inc., 19001 Lowrie Ln., Dade City, FL 33525. Road tests were run with regularly spaced strips of wood fastened to the edge of a road surface, causing a tone to be heard within the vehicle when the strips were run over at speed. Practical factors in the production of the tones are discussed. Such road sounds could be used to warn of running off the road, or as musical tones to generate a short tune for publicity purposes such as "Way Down Upon the Suwannee River," appropriate near Old Town, FL.

4:15 pm

SECTION MEETING

Joan Schwebel, Maynard Evans High School, Orlando, Presiding

SOCIAL SCIENCE

Saturday, March 26, 1994, 9:00 am - 10:15 am, Tucker 106

Michael Raich, Sarasota County Government, Presiding

9:00 am, SOC-1 The Role of Geographic Techniques and Geographical Information Systems in the Environmental Justice Movement. D.A. PADGETT, Department of Geography, University of Florida, Gainesville, FL 32611. The purpose of this study is to provide an opportunity for self-examination to social scientists and others currently applying geographic techniques and geographical information systems (GIS) in environmental racism/injustice-based research. Recent investigations conducted using significant spatial correlations found between minority/low-income communities and hazardous waste sites is discussed. The author stresses that in order to develop strong, scientifically sound evidence in environmental inequity cases, steps must be taken beyond simple spatial coincidences. Recommendations are given for addressing the often overlooked problems of scale, time and data accuracy in order to improve the defensibility of findings in future investigations.

9:20 am, SOC-2 Rewards, Work Interest, and Individual Differences. M. RAICH, Sarasota County Government, Personnel Dept., Sarasota, FL 34230. Oftentimes rewards are observed to increase motivation. However, a number of findings show that rewards can also exert no effect on motivation and even undermine it. The present paper focuses on a particular type of motivation referred to as intrinsic motivation and circumstances when rewards have been observed to enhance and undermine it. Also, a view is presented to explain the differential effects of rewards on intrinsic motivation. Key variables in this view include level and contingency of reward, work interest, and individual differences.

9:40 am, SOC-3 Fairness and Hiring the Veteran in the Public Sector. M. RAICH, Sarasota County Government, Personnel Dept., Sarasota, FL 34230. Legislation exists in the state of Florida which extends preference to selected armed service veterans during the hiring process in many types of jobs. In some cases, depending upon the hiring process used it is possible to show that affected veterans may receive greater or lesser preference to the extent that the hiring decision is changed by the particular type of preference provided. The present paper addresses ways to extend similar amounts of preference regardless of the type of hiring procedure used.

10:00 am

SECTION MEETING

Michael Raich, Sarasota County Government, Presiding

SCIENCE TEACHING

Friday, March 25, 1994, 8:00 am - 10:30 am, Tucker 104

E.L. Rhamstine, Valencia Community College, Presiding

8:00 am, TCH-1 Energy: Past, Present and Future. J.A. CHAMBLESS, W.M. MCCORD, G.A. MORALES, R.J. WRIGHT, West Campus Science Department, 1800 South Kirkman Road, Orlando, FL 32811. Valencia Community College's staff (Economics, Biology, Geology, and Physics) has developed a four semester hour energy course (with laboratory), which addresses the physical, geological, biological and environmental, and economic forces that have dictated energy usage patterns, energy policies, international conflicts, and economic growth characteristics throughout history. The subject is approached from an interdisciplinary format as the course goal is to create a knowledgeable awareness regarding the fundamental foundation of our modern industrial and technological society. Our efforts and experiences will be reported. (Supported in part by a State of Florida Department of Education Title II Energy Grant).

8:15 am, TCH-2 The Teaching of Concepts of Work and Energy at Introductory Level. G.F. TOTH, Dept. of Physics, Technical University of Budapest, 1111 Budapest, Hungary (Exchange Professor, Lake City Community College, Lake City, FL 32055). The concept of energy is a frequently used concept in our everyday life. The concept of energy is totally abstract and it is expressed through other physical quantities that in themselves are also abstract. The abstraction of the concept of energy is the source of the mystification attached to it in everyday life. The way one understands abstract concepts is to associate them to single corner observations by analysis. This paper shows a way of understanding, starting with very simple cases of pictorial mechanical observations in which the usefulness and simple application of the work energy concept are obvious. At the same time, these cases can be evaluated experimentally as well. The paper shows the disturbing problems in the understanding of the work energy concept. From the pictorial mechanical view of simple problems, the discussion can be expanded to complicated ones by showing the conditions and the possibility of exchange between the various forms of mechanical energies that are always accompanied by a partial exchange of the energy in the disordered form, the thermal form of energy.

8:30 am, TCH-3 Degree Integration in Business, Science and Technology. ROBERT W. SMITH AND WILLIAM TRANTHAM, Florida Keys Community College, Key West, FL 33040. This paper describes the successful integration of business, science and technology curricula both within and between courses and degree programs at Florida Keys Community College. The featured programs include Diving Business Management, Marine Biology Technology and the Associate in Arts degree in Biology. The two AS degrees share common science and technology courses as well as general education requirements. In addition, they have been chosen for areas of emphasis on Monroe County's Tech. Prep. program.

8:45 am, TCH-4 Environmental Classroom Training Sites in Marine Biology Technology. WILLIAM TRANTHAM, Biology Department, Florida Keys Community College, Key West, FL 33040. This paper describes selection criteria for mangrove, seagrass, and coral reef training sites utilized by faculty and students in an innovative new and expanding program to train technicians for marine industry. Students in the program use state of the art technical and scientific equipment to collect data and prepare scientific reports on each site visited.

9:00 am, TCH-5 Report of Student Attitudes on Topics of Bio/Medical Ethics. ERNEST L. RHAMSTINE, Valencia Community College, Orlando, FL 32802. Beginning in 1978 a questionnaire addressing bio/medical ethics was administered to select groups of students at Valencia Community College. Students expressed opinions on organ transplants, fetal tissue research, AIDS, medical privacy, condom use, RU-486, assisted death and related topics. Cross-tabs of 92 ethics topics with the demographic -Foreign born/USA born- disclosed numerous divergent opinions. Among other cross-tabs only the age grouping -under 21/over 21- revealed more divergence. The opinions expressed by the groups are discussed. Composite results from the years 1991, 1992 and 1993 are presented; N=793.

9:15 am, BREAK

9:30 am, TCH-6 Using an FT-IR in an Organic Microscale Laboratory. J. EMS-WILSON, Valencia Community College, Orlando, FL 32802. An NSF-ILI grant in 1992 made possible the purchase of a FT-IR. The paper provides an overview of the usage of the FT-IR to characterize reactions and identify products of microscale organic experiments. Relevant experiments and instructional activities will also be discussed.

9:45 am, TCH-7 Microscale Organic Chemistry Labs: A Student's Evaluation. MARY BETH POTATMI, Valencia Community College, Orlando, FL 32802. This presentation will include a student's evaluation (after completion of two semesters) of microscale organic chemistry labs. Comparison to macroscale techniques and career applications will also be discussed.

10:00 am, TCH-8 Chemical Management and Disposal. LISA M. SANTIAGO, University of Central Florida, Orlando, FL 32816. This presentation will explore the safe handling and disposal of excess chemicals and laboratory reaction products encountered in a community college laboratory.

10:15 am, TCH-9 Enhancement of Science Education & Awareness by Voluntary Activities. T. BAYES (1) AND S. BEAUCHAMP (2), (1) Brevard Community College, Melbourne, FL 32935, (2) University of Central Florida, Orlando, FL 32816. Collecting data and information taken in a classroom setting of science majors, non-science majors. Then, utilizing this information in a community volunteer work,

specifically Acquired Immune Deficiency Syndrome and Ecosystem programs. The specifics are described. Student involvement in such programs are discussed, data and information presented describing types of involvement. Supporting data presented showing use for knowledge gained by interaction of students and community, respectively. The roles of community leaders, support groups, faculty, and administration are discussed. Scientific value and knowledge are presented by students of science, non-science majors.

2:00 pm

SECTION MEETING

Rita A. Karpie, Brevard Community College, Presiding

URBAN AND REGIONAL PLANNING

Friday, March 25, 1994, 8:30 am - 10:15 am, Tucker 109

Lisa Beever, Charlotte Co. Metropolitan Planning Organization, Presiding

8:30 am - URP-1 Edge Cities and the Annexation Question in Florida. HEIDI J. LANNON, Office of Strategic Planning, City of Gainesville, P.O. Box 490, #13, Gainesville, FL 32602. The population of Florida is growing daily, and much of the growth is occurring in suburban areas outside municipalities. Counties in Florida have increasing populations recorded in unincorporated areas. Florida has a weak annexation law. The Florida general annexation law is examined for its downfalls. The complexity of the law makes it difficult for any property that is not already planned and developed, to meet annexation prerequisites. This does not permit municipalities to have had meaningful planning input. New residents are demanding services and counties are finding it difficult to cope. Cities, the traditional providers of urban services, are landlocked and unable to extend their boundaries. The Boundary Adjustment Act, a special act of the Florida Legislature exclusive to Alachua County, Florida, is compared as a possible solution to Florida's edge cities.

8:45 am, URP-2 Public Safety Services Demand Measurement and Financing. T.O. JACKSON, Planning and Research Services, Inc., P.O. Box 11536, Jacksonville, FL 32239. Presentation of methods to measure demand for police protection, fire protection and emergency medical services. Demand is related to the number of calls for service generated by various land uses, which can then be correlated with the costs of service provision. Discussion of alternative mechanisms for financing the capital and operating costs of these services, including traditional financing through the local government general fund, impact fees, special assessments and user fees. Examples from impact fee studies and from a proposed system of public safety service fees, based upon analyses prepared by the author.

9:00 am, URP-3 Personal Transportation Alternatives: An EMERGY Evaluation. GUY MCGRANE, University of Florida, Gainesville, FL 32611. Personal transportation, including automobiles of several types, mass transit, bicycling, and pedestrian transport are examined using EMERGY evaluation. The automobiles studied are conventional, electric, fuel cell, hydrogen, natural gas, ethanol, and methanol vehicles. EMERGY evaluation calculates the energy of one form (usually solar) required to achieve an output, in this case a passenger mile of travel. The advantages of EMERGY evaluation are that 1) it accounts both for the work of nature in building up resources and the work of man in improving them, and 2) it compares all different forms of energy (e.g., lumber, steel, human labor, and fossil fuel) on a common standard, the solar emjoule, thus avoiding the dilemma of comparing apples with oranges. Appropriate transportation modes are discussed for various scenarios, including declining energy resources, varying EMERGY content of human time, varying recycle rates, and varying vehicle loading (e.g., car pooling).

9:15 am, URP-4 The Relationship of Accidents and Levels of Service on Roadways in Charlotte County, Florida. L.B. BEEVER, Charlotte County-Punta Gorda Metropolitan Planning Organization, 28000 Airport Road, A-6, Punta Gorda, FL 33982. The Charlotte County-Punta Gorda Metropolitan Planning Organization (MPO) was established in 1992. In preparation for the MPO's first Long Range Plan and the Comprehensive Plan Update, the relationship between public safety and service levels was investigated. Public safety on roadways was measured by the number of accidents and their associated injuries and fatalities. It was determined that there is a statistically significant relationship between total accidents, injuries, and fatalities and low levels of service. However, there was not a statistically significant relationship between accident, injured and fatality rates and levels of service. The use of the results in the transportation planning process will be discussed.

9:30 am, URP-5 Market Value of Environmentally Sensitive Land. T.O. JACKSON, Planning Research Services, Inc., P.O. Box 11536, Jacksonville, FL 32239. Presentation of elements affecting the market value of large tracts of environmentally sensitive land, including land classified as: uplands and upland habitat areas; lower elevation wetlands; and potential sovereign lands. Value influences and elements are related to alternative uses for such land by public agencies and the private sector. Examples from studies by the author of land surrounding Lochloosa Lake in Alachua County, the Pumpkin Hill Creek CARL area in Duval County and lands along the Econlockhatchee River in Orange County. Also discussed is the proposed mitigation banking system, involving the sale of offsite mitigation "credits."

9:45 am, URP-6 Protecting the Water Quality of Biscayne Bay. D.W. BLACK, South Florida Water Management District, 3301 Gun Club Road, West Palm Beach, FL 33416. Biscayne Bay is an Outstanding Florida Water and much of it is contained in Biscayne National Park. The watershed includes the City of Miami, extensive additional

urban areas, and agricultural land. The Future Land Use Plan Map for Metro-Dade County projects substantially increased development in South Dade County by 2010. Although Hurricane Andrew has changed the face of South Dade and projections will have to be revised, the area will be the site of re-building and additional development in coming decades. Much of the stormwater in the Biscayne Bay watershed enters canals which carry it directly to the bay without the sheetflow through wetlands that purified inflows before the area was developed. Thus, protecting Biscayne Bay from water quality degradation from stormwater is a challenge. An intergovernmental program that integrates environmental engineering with land use regulation appears to be the most practical approach.

10:00 am, URP-7

Twenty Years of Development of Regional Impact Review.

S.E. BLACK, Treasure Coast Regional Planning Council, P.O. Box 1529, Palm City, FL 34990. The Development of Regional Impact (DRI) review process has influenced the nature of large land developments in Florida. At least some of the original objectives of the legislation that established DRI review are being met. Changes in regulatory criteria and implementation of growth management legislation have made the DRI review process partially redundant. Recent legislation transfers review responsibility to local government by 1997. This change will deliver immediate benefits by making permits for large projects quicker and less expensive to obtain. Elimination of the present multi-agency review process, however, may create long-term problems.

10:15 am**SECTION MEETING**

Lisa Beever, Charlotte County Metropolitan Planning Organization, Presiding

POSTER SESSION

Friday, March 25, 1994, 2:00 pm - 4:00 pm and 4:00 pm - 6:00 pm, Lobby, Tucker Hall

POS-1 (BIO)

The Effects of Annual Burning on the Understory of a Hydric Slash Pine Flatwoods in Southwest Florida. JAMES W. BEEVER III (1) AND LISA B. BEEVER (2), (1) Office of Environmental Services, Florida Game and Fresh Water Fish Commission, Punta Gorda, FL 33955, (2) Charlotte County-Punta Gorda MPO, Punta Gorda, FL 33982.

POS-2 (BIO)

The Relative Abundance of the Genus Terpsinoe in the Algal Community of Blue Spring Run, Florida. MONICA FLACON, PATRICIA BERRY, AND MICHAEL REITER, Department of Biology, Seminole Community College, Sanford, FL 32773.

POS-3 (AGR) Toward a Standard Methodology for the Description of Mayflies (Insecta: Ephemeroptera). **MICHAEL D. HUBBARD**, Entomology, Center for Water Quality, Florida A&M University, Tallahassee, FL 32307.

POS-4 (AGR) A Bootstrap Rarefaction Method Demonstrates Temporal Change in a North Florida Stream. **MICHAEL D. HUBBARD** (1), **KERRIE M. SWADLING** (2), AND **MANUEL L. PESCADOR** (1), (1) Entomology, Center for Water Quality, Florida A&M University, Tallahassee, FL 32307, (2) University of Tasmania, Hobart, Tasmania, Australia.

FGAMP SPECIAL SESSION

Saturday, March 26, 1994, 8:30 am - 10:00 am
Special Symposium

Factors Influencing Instruction and Retention in Introductory Science Courses. Sponsored by the Florida-Georgia Alliance for Minority Participation in Science, Engineering, and Mathematics.

8:30 am Undergraduate Student Presentation: Refinement of a Novel Visualization Technique for Studying the Surface Activity of Detergents and Determining Critical Micelle Concentrations. **MR. PETER CABAUY**, Department of Physics, Florida International University, Miami, FL.

9:00 am Graduate Student Presentation: Studies of the Effect of Cadmium on Glyceraldehyde-3-phosphate Dehydrogenase on the Integrity of DNA. **MS. MARGARET LYLES**, Department of Chemistry, Florida A&M University, Tallahassee, FL 32307.

9:30 am Faculty Presentation: Teaching Approaches in the Sciences Which Influence Success in the Freshman Year. **DRS. JACQUELINE HUNTER AND DIEDRE LABAT**, Professors of Biology, Xavier University, New Orleans, LA.

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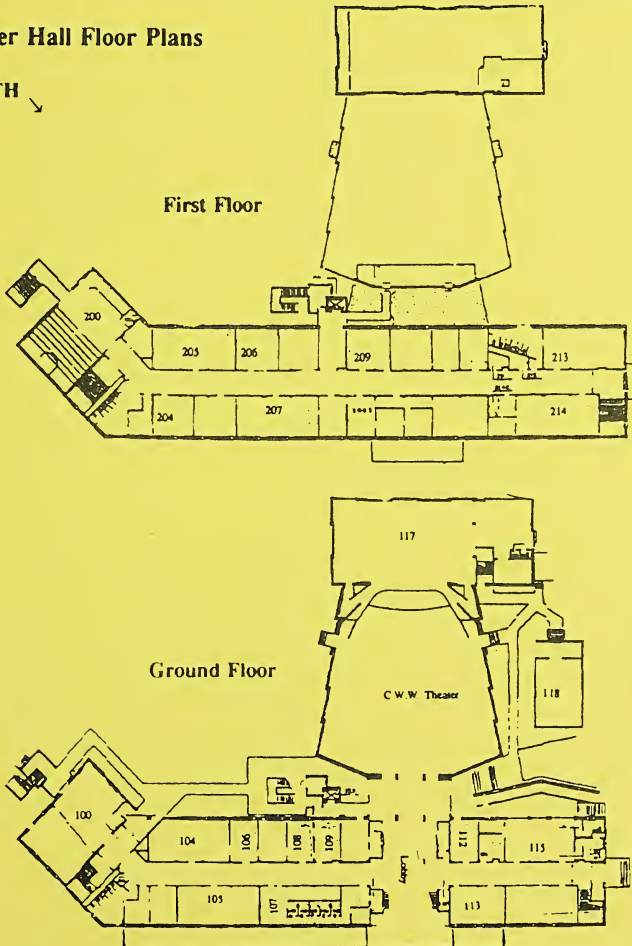
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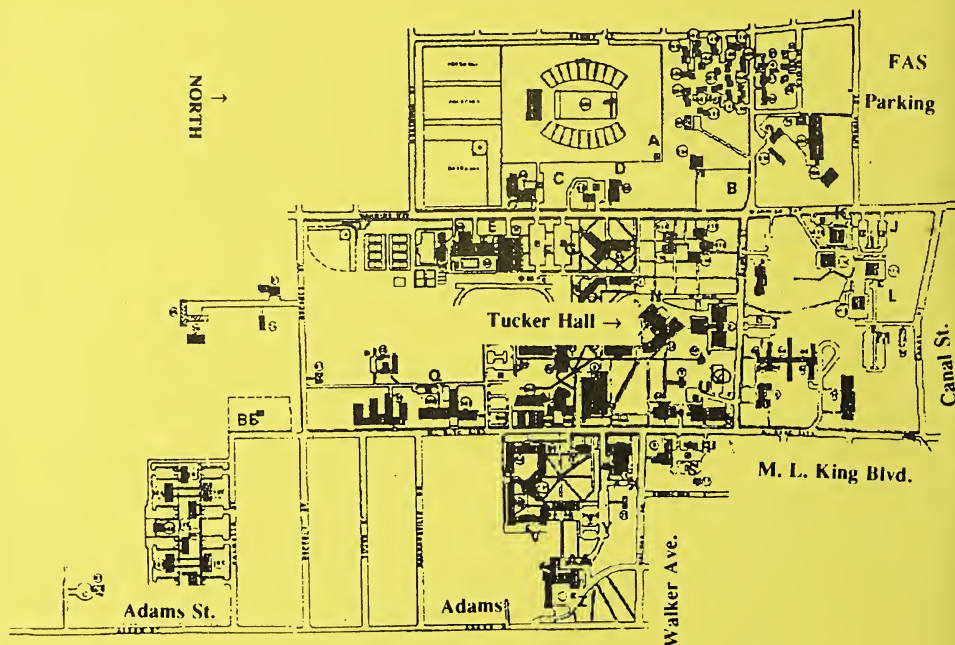
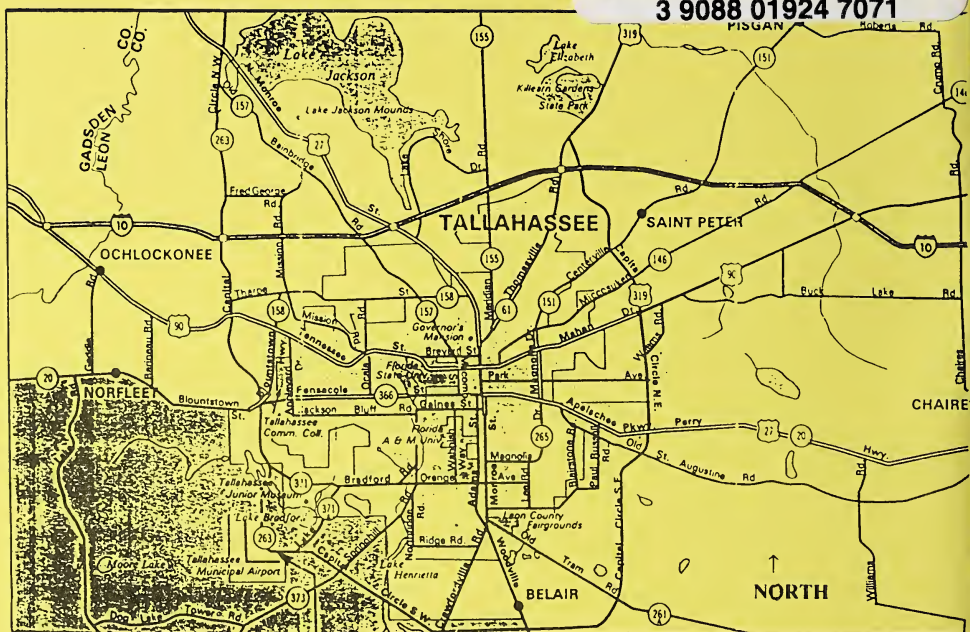
Tucker Hall Floor Plans

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Campus Map

FLORIDA A&M UNIVERSITY
Tallahassee, Florida